CHEMICAL MARKETS

VOLUME XXIV ESTABLISHED 1914 NUMBER 3

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Consulting Editors:

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CHARLES R. DOWNS
WILLIAM M. GROSVENOR
ARTHUR D. LITTLE
CHARLES H. MACDOWELL
JOHN E. TEEPLE
T. B. WAGNER
MILTON C. WHITAKER
FRANK C. WHITMORE

WILLIAMS HAYNES
Editor and Publisher

ELMER F. SHEETS
Managing Editor

WILLIAM F. GEORGE
Advertising Manager

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CHEMICAL MARKETS

VOL. XXIV. MARCH, 1929 No. 3.

Are Patents Property?

MODERN chemical manufacturing is peculiarly dependent in America upon patent rights. Our Government recognizes as patentable a new product resulting from a new combination of chemical elements, a protection not granted in all countries to chemical patentees. Without discussing the pros and cons of the arguments that have waged around "product patents," it must be admitted that this is an unusual measure of protection.

OBVIOUSLY the intent of the founders of our patent office was to offer extraordinary inducements to inventors. This is the theory. The facts, which in time have come to be quite a different matter, are set forth most vividly in Dr. Grosvenor's article, "Sterilizing the Seeds of Progress", on another page of this issue.

IF a man steals your watch the whole power of the government is set in motion to recover the stolen goods and punish the thief. If a man steals your patent, which is recognized by the Constitution, as a property right, it is you who must hale him to justice by proving first that you had a right to the right the Patent Office gave you and second, that he actually did you a damage. The attitude not only of the public, but of the Courts also is markedly different towards the patent pirate and the common thief.

WHY? And furthermore, what are going to be the results in chemical industry, if the property right in new discoveries continues to be so flagrantly disregarded.

"See American First"

WARRIOR, hunter . . . statesman, orator . . . fierce, nomadic . . . was the red man, misnamed Indian. He enjoyed exclusive occupancy of the whole American continent for at least a thousand years. His supremacy, wrested from a prehistoric race, was in turn lost to a superior civilization. Successive waves of white men submerged him, yet even today there are 180,000 full blooded Indians in the United States."

ALCOHOL EVERCLEAR ALCOHOL
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MANUFACTURERS who use Alcohol classify it as an essential ingredient . . . a basic factor in production processes. Use of the highest quality therefore is implied.

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These qualities constitute advantages for your products. They are due to an exclusive distillation process originated in our plant in the heart of the grain country. "Everclear" may be safely standardized upon.

"SEE AMERICAN FIRST"

COMMERCIAL ALCOHOL CORPORATION

420 Lexington Avenue, New York, N. Y.

Plants:

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Chemico-Agricultural Economics

Farms as producers of raw materials for American chemical industries is a theme which during the past couple of years has been well embroidered both by chemical and by agricultural experts. It is most beguiling to picture the miracle-working chemical factory as a sort of glorified national incinerator into which we shall joyfully dump all our farm surplus, waste, or what-have-you, drawing forth a brave array of profitable products. Much has been done along these lines. More will come in the future. But it is all not quite so simple as it seems, and seriously to present such proposals as practical, immediate measures of farm relief is a delusion to the farmer and an injustice to the chemical industrialist. Already this plausible error is beginning to exert these undesirable effects.

Our corn crop is roughly two and three-quarters billion bushels of which over two and a quarter billion are consumed on the farm and come to market chiefly as pork and beef, milk and eggs. Three hundred and fifty million bushels come to the American market as corn at American prices. Some thirty million bushels only represent our exportable surplus which must go out into world markets at world prices. To get rid of that exportable surplus, so relieving American corn prices of the pressure of world competition, is a favorite key for unlocking the farm problem.

Now a bushel of corn will produce two and a half gallons of alcohol. Our alcohol production, as set by the Prohibition Commissioner, is eighty million gallons. How neatly the figures click! Produce our alcohol from corn instead of molasses, and presto change! the exportable surplus of corn has vanished. Mathematics so simple, a result so obvious can not be overlooked. The farmer proposes to Congress a prohibitory duty on molasses from Cuba for the laudable purpose of solving the farm problem throughout the corn belt, since with no surplus the price of corn could be raised to "American standards."

This glib proposal would have effects upon the chemical industry which its proposers have apparently overlooked. To force such a switch in raw material sources would completely disarrange the geography of the alcohol industry and its nice adjustment to consuming markets. To raise the cost of raw material would increase the price of alcohol which would immediately jeopardize its present greatest market as an anti-freeze in the motors' trade, and any considerable curtailment of this demand, which alcohol enjoys in part because of its low price, would mean that the corn surplus would not be taken up. More remote, but more serious is the threat of synthetic alcohol made of purely chemical raw materials by chemical processes. The process has been worked out; it is not commercially feasible to-day chiefly because alcohol is now made of a waste by-product, molasses, and there is virtually no limit as to how low its cost might go if faced with determined synthetic competition. Peg the molasses price, however, by whatever means, and synthetic alcohol becomes distinctly a commercial proposition. No producer of natural raw materials can afford to-day to throw a mailed gauntlet into the arena of price competition with the synthetic chemical manufacturer. The example of vanilla beans and gum camphor is a plain warning to corn. Be advised, all good friends of the farmer, and enter into an alliance with modern chemistry in order to move a greater volume of farm products through the modern industrial method of lower prices which increase demand. For the supplier of raw materials—be they natural or chemical products—there is no other certain rule of success in this chemical era of industrialism.

"The Salt of the Earth"

A variety of yardsticks have been used to measure the heights of human accomplishment. A soap consumption (as big as possible) and a percentage of illiteracy (as small as possible) have been favorite indicators of modern civilization. Industrial activity has been estimated upon the basis of coal or sulfuric acid. These four criteria have acquired a proverbial standing, and for the chemical industry the production of sulfuric acid has an almost classical meaning.

That we have passed through a chemical revolution which has destroyed old values and set up new standards is acknowledged by us all; but even those of us in the forefront of these chemical changes are apt to repeat these catch phrases parrot-like with little true apprehension of their full meaning. It comes as a mental jolt therefore, to know that one of our very largest chemical manufacturies does not buy a single pound of sulfuric acid from one year to the other, except small quantities of C. P. material for laboratory use, neither do they make a single

drop for their own consumption. And this is no small operation. They consume over eighty tons of coal daily, and ship each month an average of over one thousand carloads of chemicals. Neither is this a restricted line; but they are regularly producing more than fifty different items.

The Chemists' Club dinner last month to Dr. Dow was a well-deserved tribute to the chemical skill, the engineering ability, the organizing genius which has built up a vast chemical enterprise, and we should like especially to emphasize the crowning achievement of this great chemical industrialist in building this great industry upon the foundation of a single chemical raw material. To produce phenol and Epsom salts commercially out of the mixed chlorides and bromides of the Michigan brine without the use of sulfuric acid is a consumate chemical triumph. It is an example that points the way to the very highest chemical employment of the world's natural resources. American chemistry and American chemical industry have reason to be proud of Dr. Dow's distinguished achievements as a technician and an industrialist.

Quotation Marks

Total weight of British rayon sold in 1928 amounted to 45,000,000 pounds, an increase of 10% over 1927. Of this amount, a very large proportion was disposed of at less than cost. If all concerned in the industry realized the seriousness of the present difficulties, the troubles might prove to be a blessing in disguise, but it would be disastrous if blindness to the facts should lead to another outburst of ill-founded optimism.—*Samuel Courtauld.*

Capital may be characterized as frozen wages. When capital is invested, that is when plants are built, capital melts into wages again. As plants for improvement of coal must be built, investment in such plants acts as a stabilizer of industry and labor. "Coal improvement" ought to become the watchword for a new triumph of coal.—*Dr. F. zur Nedden.*

The big producers (artificial silk) are steadily reducing their production costs and this enables them to sell at lower prices and the result must be that artificial silk will be used in increasing quantities and will replace not only cotton to a greater extent each year, but also natural silk and wool.—*G. M. Whigham.*

If the experience of the last nine years is a safe barometer by which to gauge the ensuing twelve months, a forecast of 15,000,000 to 20,000,000 pounds increase in production and consumption of rayon in the United States for 1929 should be a conservative estimate.—*Hiram S. Rivitz.*

Formerly a manufacturer guessed at his costs, added his profit to arrive at a price, and lifted a prayer for a demand that would bear it. Now it is the other way round. Instead of adding your profit to your costs to make a price, you reduce costs to make a profit from the price.—*Garet Garrett.*

It would be a mistake to suppose that the organization of the material side of existence has been completed. But it has progressed far enough so that a moderate amount of industry and thrift is all that is needed to relieve the great mass of our people from the pinch of poverty.—*Calvin Coolidge.*

The will of God is not something to be submitted to, but something to be worked out.—*Harry Emerson Fosdick.*

Some of my finest perorations have been achieved when I have been negotiating a recalcitrant ball in a peculiarly venomous bunker.—*Winston Churchill.*

The real foundation of the business world is neither labor nor capital nor that elusive individual, the ultimate consumer. It is science.—*E. E. Free.*

There is nothing which can better deserve your patronage than the promotion of science.—*George Washington.*

If every one were satisfied, no one would buy the new thing.—*C. F. Kettering.*

Ten Years Ago

From our issues of March 1919

General Chemical Co., elected following officers: chairman, William H. Nichols; president, W. H. Nichols, Jr.; Secretary, James L. Morgan; treasurer, Lancaster Morgan.

Steel Cities' Chemical Co., Birmingham, Ala., began manufacture of sulfuric acid.

Carus Chemical Co., incorporated in Illinois with capital of $200,000.

Franklin H. Kalbfleisch elected president, Kalbfleisch Corp., succeeding Robert S. Perry.

Wayne Wood Products Co. organized with capital of $750,000.

Diamond Alkali Export Corp., formed with capital of $100,000.

Seventy thousand shares of preferred stock of National Aniline & Chemical Co., valued at about $6,000,000 were sold by the Schoellkopfs of Buffalo.

Mathieson Alkali Works passed a stock dividend for first time since 1907.

Heyden Chemical Works was finally sold for $1,500,000 to Allan F. Ryan at Alien Property Custodian auction.

"NOW IT CAN BE TOLD"

Dr. L. C. Jones' Story of the Solvay Alkali Enterprises

As Told to Williams Haynes

Cogswell, the engineer, and Hazard, the financeer, brought the Solvay ammonia soda process to America---how lucky a chance was the inspiration of this venture and what desperate difficulties were conquered as told here in a new kind of chemical industry history---the personal reminiscences of a chief actor in the drama. This is the first instalment of a series of "Now It Can Be Told" series in which the "inside story" will be told to CHEMICAL MARKETS *readers.*

ERNEST Solvay, the Belgian, was the first chemical internationalist. Half a century before the earliest ambitious dream of a European chemical cartel, he perfected a world-wide alkali manufacturing organization, bound together by working agreements on industrial chemical experience and good will, and as we now look back on his fine record of accomplishment this stands to-day as his most significant contribution to chemical industry.

Although his ammonia-soda process for the production of soda ash was a revolutionary development which, abetted by the electrolytic process for caustic soda and chlorine, changed the entire alkali industry; nevertheless this important advance in technique is now less important than the new commercial policy he introduced. Although the Solvay process still stands supreme for the production of that chemical which of all others except sulfuric acid, bulks largest in tonnage consumed by the world each year, nevertheless Ernest Solvay's broad vision of chemical industry and his firm conception of what we have come to know as "big business" and "Modern management" opened up entirely new fields in chemical industry.

A happy combination of circumstances had early given England complete domination of the world's heavy chemical trade. A Frenchman, Nicholas Le Blanc, back in 1791, had perfected the first commercial soda process and thereby laid the corner stone of the present colossal alkali industry. But unfortunately for this ingenious chemist, his financial backer was the royalist Duc d'Orleans, accordingly the tiny alkali plant at St. Denis was seized during the French Revolution; and although Napoleon, sore pressed by war needs, restored the works, he could not renew the spirit or the health of the old, broken chemist. Le Blanc crept back again to his refuge in the poorhouse to commit suicide. Thus ended, temporarily at least, the alkali industry in France.

Meanwhile the Industrial Revolution was creating in England a new, undreamed of demand for chemicals, and when the excessive tax of £30 a ton—a legacy of the Napoleonic Wars—was removed from the essential raw material, salt, in 1823, that same year James Muspratt erected his alkali works near Liverpool to operate the Le Blanc process. Shortly before Charles Tennant had discovered how to produce bleaching powder by liberating chlorine from salt and absorbing it in hydrated lime. A little later William Gossage, whose life's passion was the recovery of by-products, perfected his process of absorbing the chloride, that terrible nuisance of escaping fumes in Le Blanc operations, and so also provided a commercial supply of muriatic acid. In fact, this soon became an oversupply and in 1870 Henry Deacon worked out a commercial method of using this by converting muriatic acid into chlorine. Sulphur was also being recovered by the Chance process and converted to sulfuric acid. Thus out of the Le Blanc and its associated processes the British chemical manufacturers were producing caustic, bleach, ash, chlorine, and both sulfuric and muriatic acids. They had a rapidly expanding home market and the world to absorb their surplus. Most important of all, an outstanding group of chemical pioneers—such men as James Muspratt, Charles Tennant, Deacon, Shanks, Spence, the elder Mond, John Brock—supplied executive and chemical leadership of rare quality.

To storm this powerfully entrenched position with a new process, even an improved process, but without these valuable by-products, was no easy task and it was some twenty years after Ernest Solvay began his first commercial operations in a small plant at Couillet, Belgium, in 1863, before his ammonia-soda process became a factor in the market. The then-young firm of Brunner-Mond was the first to take it up in England. At that time, there was no alkali industry at all in the United States.

A rugged, eccentric, friendly-spirited mining engineer and a polished, wealthy, fair-minded textile manufacturer transplanted the Solvay process to America and in doing so founded our alkali industry. These two chief actors have passed from the scene; but up in a light, corner workroom—a more truly descriptive word than "office"—on an upper floor in a big building in mid-town New York may be found a stocky, energetic, grizzle-haired chemical engineer who as a youth just graduated from Yale joined the staff of that pioneering enterprise.

Years and honors alike rest lightly on Dr. Louis Cleveland Jones' square shoulders. He rose in time to be chief chemist of the Solvay Process Company, chemical director of its subsidiary, the Semet Solvay Company, vice-president, Solvay Collieries Company, and the National Aniline & Chemical Company and later general manager of the Atmospheric Nitrogen Corp. Moreover, he has himself been a pioneer. He was thick in the initial development of our by-product coke ovens. He built the first sulfate recovery plant in America. He was first in the Solvay ranks to sense the coming importance of synthetic ammonia, and he was in charge of the research and operating experiments which led to the first commercially successful ammonia synthesis outside of Germany. To-day he heads an engineering corporation which has built ammonia plants all the way around the world from Russia to Japan.

Cogswell and Hazard

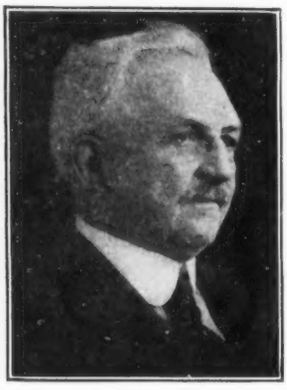
And yet almost his first words were: "I didn't have a thing to do with the initial development. I just slipped into Syracuse and went to work in the laboratory. There was no reception committee. Nobody paid any attention to me. We were all terribly busy, and I was just another young chemist. The idea was originally Cogswell's. The guiding genius was Rowland Hazard. Those two men, as different as day and night in everything except their habits of honest thinking and fair dealing, they made the whole thing possible."

He puffed vigorously at his briar pipe and added, "It is curious what a little, chancy thing will have unexpectedly big effects. If William B. Cogswell had not happened to visit the Centennial Exposition in Philadelphia, much chemical history would never have been written."

The Birth of an Idea

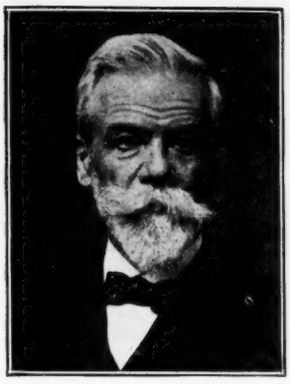
"Cogswell", he continued after a moment or two, "was a trained engineer who took up mining after serving in the Union Navy during the Civil War. In 1876 he was in charge of some zinc operations at mine Lamott, Missouri (which are still being worked and which were owned by the Hazards a family influential in Rhode Island since colonial times. He took a well earned vacation—he was always a glutton for hard work—by coming East to the Exposition, and while there dropped into a session of some international congresses held in connection with the exhibits. They must have taken their World's Fairs pretty seriously in those Victorian days, for he made notes on a paper he heard describing the ammonia-soda process. Mulling over his notes he figured out that near his birthplace in western New York there was an abundance of brine and limestone, the two most important raw materials of the Solvay process while the Erie Canal, running through the heart of this section, furnished the cheapest available transportation. Inquiry revealed that despite a growing demand from a score of industries there was no domestic production of alkali.

"Armed with these facts, loaded with figures, he went to Mr. Hazard and asked him to finance a Solvay alkali plant of fifty tons daily capacity of soda ash at or near Syracuse, N. Y. In 1880 he crossed the Atlantic to seek out Ernest Solvay and negotiate for the American rights to his process.



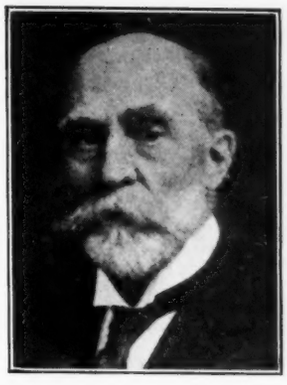
E. N. Trump (left) is to-day the only man living who saw the first spadeful of earth turned for the foundations of the plant at Syracuse, N. Y., which has grown to be the largest soda ash unit in the world.

Frederick R. Hazard, son of Rowland Hazard, soon succeeded his father as the active administrative and financial head of the Solvay Process Company.



Ernest Solvay (left) built up the first international chemical combination through his consumate ability as an organizer and co-ordinator backed by his keen judgment of men's character and ability.

If W. B. Cogswell had not gone to the Centennial Exposition in 1878, all this story of the establishment of the American soda industry would have been, quite different for it was his idea and only his tact made it possible



"Cogswell's dynamic energy was severely checked by the coolness of his reception in Belgium. Mr. Solvay might be characterized as a preeminently 'civilized' man; reserved, calm, with a keen, fine sense of humor; a gentleman to his finger-tips. He had been approached before by American promoters. Their proposals did not impress him and their manners had disgusted him. He confessed once, half jokingly, that till he met Cogswell he firmly believed that all Americans chewed tobacco and sat habitually with their feet on the desk. With no suspicion of this preconceived prejudice, Cogswell captured the confidence and respect of his reserved host. Negotiations were begun which resulted eventually in the building of that pioneer plant on the shores of the lake on the outskirts of Syracuse."

As a matter of fact, reviewing now these historic arrangements, Dr. Jones could hardly have overemphasized the triumph of William B. Cogswell as a negotiator of tact and skill. There was little reason why the Solvays should be predisposed to American affiliations. Our market was strictly a European export field at the time, and their new plants in England and in France both counted heavily upon our consuming demand as an outlet for their surplus. But Mr. Solvay was a true chemical internationalist. It was always his policy to establish plants in any country whose domestic demand was sufficient to justify the investment. As Dr. Jones phrased it:

"He believed in national self-sufficiency, and often against the counsel of less far-sighted associates whose longing eye was fixed on export markets, he furthered projects in new countries. His rule, which I believe was invariable, of never accepting cash or royalties; but of taking his financial reward in common stock of the associated companies, only confirms his fundamental conviction.

An International Rivalry

"This stock participation also made possible an exchange of information between plants in different countries which had far-reaching beneficial results. In fact, this was the most important single factor in the progress and ultimate success of the Solvay process over rival operations. Each month every Solvay plant sent to headquarters a complete table summarizing their operations in detail as to power and raw material consumed, and all labor costs per hour. So detailed were these that the table was a sheet the size of two newspaper pages. These were reduced to common cash values and sent to all plants for the comparison of every section of all operating departments. A friendly international rivalry was thus encouraged. Your chagrin, if you were 'low man' and your elation if 'high' in such a great game, were very real. Thus, too, any improvement in one plant was quickly spread through the alliance. The Russians, for example, made a very important saving in drying dense ash. Cogswell himself contributed improvements in the cooling towers which greatly increased output, and our Andrew H. Green, of the Detroit plant, later vice-president, refined the methods of precipitating bicarbonate.

The Executive Teams

The typical Solvay organization had a pair of chemical executives; one team in each country, Belgium, England, and the United States. Ernest Solvay the chemist and his brother Albert, the industrialist in Belgium; Dr. Ludwig Mond the chemist and John Brunner, his financial backer in England and William B. Cogswell the engineer and Rowland Hazard also a pioneering industrialist in the United States.

All these men were as one as to mutual co-operation and fair dealing, profit sharing to employees, and responsibility to their communities.

"In those days", continued Dr. Jones, pausing to relight his pipe, "Europe habitually used more labor, and we more labor-saving machinery. I remember my shock when I first visited the Belgian plant on seeing coal being unloaded by husky maidens. But our comparative charts proved beyond doubt that at that time the labor cost of such operations abroad did not total the cost of automatic machinery, including of course, interest, depreciation and upkeep. Later the use of machinery became an American advantage; but this was only as the plants expanded to larger scale operations. Then Europe had to follow our lead in these matters. But always this quick, frank exchange of cost data and production records, and the fact that we were all at any time free to visit every plant made for great progress.

"In our American Company, success due to this rapid technical advance was ably supplemented by the esprit de corps of the organization. The leaders, William Cogswell and Rowland Hazard, shared, as I said, their sense of justice. The company was not only a real pioneer in establishing schools and hospitals and other forms of social service work among the workmen; but the operating and administrative executives had responsibility put upon them and were well rewarded by exceptionally, generous profit sharing if they made good. Rowland Hazard was early succeeded by his son Frederick R. Hazard, who was a great man physically and mentally, and continued the international Solvay policy of sharing with the workers the gains of the industry. Mr. Hazard, though he served as president and was active in financial affairs, never drew a personal salary, taking his reward, like Mr. Solvay, in dividends. Cogswell, as active manager, had a genius in building up an organization. This was his chief concern, and the moment initial negotiations appeared to be successful, he began collecting his staff. A young engineering student at school in Germany, William L. Neil, son of an important man in the New Orleans cotton trade, had served him as interpreter and he brought him back with him. Two other young men just out of college, E. N. Trump from Cornell and Henry R. Cooper from Pennsylvania—both destined to become important executives — joined the original staff. Trump, an engineering wizard, is, I believe, the only man now alive who saw the first spadeful of dirt dug for the original plant at Syracuse. Cooper was overcome by ammonia fumes at the initial operation of the new plant, and falling bruised his head so that he was laid up for many months. Neil was succeeded by John D. Pennock, my first immediate superior, as operating chief, a bigger man, doing a much bigger job as the enterprise grew and grew and grew.

Cogswell's Diamond

"Cogswell had real genius for picking young men; rare skill in developing their best; and a quality of leadership that won their affection and esteem. The workmen called him 'Alkali Bill' and worshipped him, though he was a hard worker and strict master. Always he was something of an eccentric. His pockets, for instance, were always filled with trinkets, often jewels which (probably because of his mining experience) always had for him a strange fascination. Once in Dresden, having missed a train to Berlin, he was wandering about the city when a sparkle way across the city park caught his eye. It was a big, yellowish stone in a jeweller's window—too brilliant, he suspected, for a topax. He learned that it was an off-color diamond, roughly cut, and priced at twelve hundred dollars. He drew his letter of credit down to the vanishing point and went off with the stone in his pocket where he carried it for years. Long afterwards his wife, whom he accused of merciless mercenaryism, after twitting him unendingly over his diamond pocket piece obtained his consent to an appraisal. The stone weighed ninety carats and was valued at hundreds of thousands, but this made no impression upon him at all and he continued to carry it in his trouser pocket along with a rare collection of all sorts of odds and ends.

"But do not think," Dr. Jones added quickly, "that Cogswell was careless about money. One of his favorite sayings at directors' meeting was 'I don't want dividends after I'm dead.' " He meant it too, and he left no stone unturned to assure those dividends."

John D. Pennock, as operating chief was directly responsible for laying sure and true the manufacturing foundation of the Solvay firm in America.

The first year of operations at the new Syracuse plant was, according to all reports, a twelvemonth of pure trouble. Although there were French and Belgian chemists and engineers, and a number of Belgian foremen on hand, the great difficulty was with apparatus. This is not surprising, for the ammonia-soda process was the very first gas-pressure distillation-evaporation problem which our equipment makers had to help solve. Several workmen were killed, and there were many accidents, much wasted materials, and disappointment after disappointment. In the end, however, the triumph was so complete that the plant was able to double what had been its projected 50 ton capacity. From that time forward the enterprise was increasingly successful. To-day that Syracuse plant is the largest soda ash operation in the world with a daily capacity of 1,800 tons. Ten years after the initial plant was built, another was erected near Detroit.

Erection of the First Recovery Coke Oven

"In the first operation at Syracuse"—to pick up again the thread of Dr. Jones' story—"ammonia was bought from the gas companies; but in the early nineties we erected the first recovery coke oven built in the United States. From this it was a short step to the manufacturer of coke ovens themselves. The third plant installed was at Enslie, Alabama for the Tennessee Coal, Iron, and Railway Company—now the southern unit of the U. S. Steel Corporation—and just the other day one of their officers told me that those ovens are still working. It was to this same plant that I was sent to install the first ammonium sulfate unit. I arrive in February, armed with the enthusiasm of a boy on his first, big, outside job and

two or three blue prints, with instructions to have the plant in production by April. Delivery would then begin on a contract with the Grassellis for thousands of tons of sulfuric acid. Mason H. Sherman, manager of the plant, and I were able to keep the schedule, but our acid supply was so full of arsenic that our sulfate came out a pretty olive green—thanks to the ferrocyanides present—and we had to turn round and build an acid purification plant.

"But those were the 'rare old days'—they sent me off all over the mountains of Tennessee and West Virginia prospecting for coal properties, for we organized the Solvay Collieries to supply good coking coal to the affiliated and subsidiary companies thruout the middle west who were operating Semet-Solvay ovens. We had a variety of arrangements. The Detroit and other plants we owned lock, stock and barrel. In Milwaukee we took over the by-products and made our profit out of them. The By-Products Coke Company, in Chicago, was quite independent.

"During this period too besides chemically pure benzene and solvents we were the first to produce pure aqua ammonia, water white, from crude liquor. This ammonia and the sulfate we turned over to the Barrett Company to sell. They had come into the coal-tar distilling business in Philadelphia, and being clever commercial people, handled the sales for us—an alliance which contained a germ which has since sprouted and grown into the Allied Chemical & Dye Corporation. But all that, like the war developments is quite another story."

Poland's potash industry is prospering despite difficulties encountered in its early history. In 1921, sales (pure potash content) amounted to 4,511 tons, and by 1927 this total had grown to 37,104 tons. It is estimated that output for 1928 will exceed 50,000 tons. Capital of "Tesp" Company is now 15 million zlotys and company plans construction of two new mines and manufacture of concentrated potash salts, with which it is hoped to drive German competition entirely out of home market.

Acetic acid from alcohol has been produced in Germany for some time, according to the Department of Commerce. It is possible that this alcohol is derived from molasses mash although alcohol from other raw material is as useful. The Holzverkohlung process involves the air oxidation of alcohol without addition of heat, using silver wire nets as a catalyst. The aldehyde thus produced is then further oxidized to acetic acid. German letters patent No. 442,729, granted to Holzverkohlungsindustrie A. G., cover this process.

Imports of chemical products into Canada were valued at $36,963,694 in 1928 as compared with $33,313,500 in 1927. This included drugs and medicines, $3,715,028; dyeing and tanning, $4,093,581; fertilizers, $5,019,841; paints and varnishes, $5,549,481; potassium compounds, $465,353; soap, $1,166,910; and sodium compounds, $3,465,965.

Norsk Hydro air fixation company, Norway, in which the I. G. is heavily interested is reported by the Department of Commerce to be planning to begin production of fixed nitrogen during the coming summer at its two new plants. One at Heroya will have capacity of 80,000 tons fixed nitrogen annually.

Thirty-fifth Chemists' Exhibition will be held in New Hall of the Royal Horticultural Society, London, May 27-31.

Chemistry in the United States Department of Agriculture

Editor, CHEMICAL MARKETS:

Doctor Wiley in the February number of CHEMICAL MARKETS writes very interestingly of the chemical work of the Department of Agriculture. He thinks he sees duplication galore. Unfortunately the good Doctor has been out of intimate touch with the Department work for many years and is evidently not well informed as to the scope and purpose and relationship of what he is pleased to designate as chemical work.

The Doctor has always had in mind a great central Bureau of Chemistry, not alone to serve the various Bureaus of the Department of Agriculture, but of the whole Government service. If all chemical work of the Government were brought together what a magnificent organization it would be! What a monument to the value and glory of chemistry, the great key science, barring possibly physics and biology.

The problem of the Government is the same as that of industry. It is to use science for the promotion of human welfare and industrial efficiency. The fight to magnify chemistry obscures the main purpose of chemistry as a tool or means of solving problems. The problem of the Government is how to most effectively use chemistry for this purpose.

There are certain routine types of chemical analysis that can be centralized and when this can be done with efficiency and saving it should be and very largely has been done. But the great Government Bureaus are generally organized for specific types of work with definite objectives. The problems and objectives are frequently and in fact usually not related to each other. If the problem is the protection of the public from adulterated food the objective is to detect the adulterations and prosecute those responsible. This may involve research, but it is research with a specific application to procedures under the pure food act. The chemists must get their facts and defend them in court. Everything else must be subordinate to this end.

Experience has shown that an organization with such regulatory duties is not adapted to conduct research in the general fields of food chemistry. Men conducting fundamental research can not be called off to prepare court cases or to do similar work without greatly interfering with the efficiency of research.

It is, I think, without exception the judgment of administrators in the colleges and universities and in large industrial concerns that the two types of work should be separated to secure the highest efficiency.

If the pathologists in the Bureau of Animal Industry have the problem of determining the chemical aspects of some disease they must have at their command, to work intimately with them, chemists skilled in this field. So with plant industry, dairy, fertilizer, etc. Chemistry is a means to an end, not the end itself. That is true of all the great subject-matter Bureaus.

The real danger in the Government service is that those responsible for these great services will forget this and think more of the *glory* of their *Bureau* than of the service it may perform.

While, as I have pointed out, this idea of centralizing all chemical work is fallacious from the standpoint of economy and efficiency, there is also a need for a strong central organization built around chemistry as a science. This chemical general staff acts as an aid to those needing chemical help, either in furnishing it directly or in pointing out the best means of having the work organized in the most efficient manner. Such a central staff does exist in the Bureau of Chemistry and Soils. It is fundamentally a research unit, though in some branches extensive service laboratories are maintained so far as it is more economical to do so than to locate them elsewhere.

The questions of cost and efficiency are always the deciding motives rather than the idea of the unification of all chemical work, which to say the least is inefficient and uneconomical.

A. F. WOODS,
Director of Scientific Work,
U. S. Department of Agriculture.

Feb. 27, 1929.

Development of the Sodium Phosphate Industry

By John A. Chew

Vice-President, Westvaco Chlorine Products, Inc.

OCCUPYING a position of relative unimportance in the chemical industry a few years ago, the consumption of the various grades of sodium phosphate, i. e. monobasic, dibasic and tribasic has increased to such an extent that there are now located in various parts of the United States, eleven plants for the manufacture of one or more of these salts. In 1914 the total production was only 30,000,000 pounds with an approximate value of $850,000. Whereas the recent investigation of the U. S. Tariff Commission shows that in 1926—165,000,000 pounds valued at nearly $6,000,000 were produced in this country, in addition to which constantly increasing quantities are being imported from Belgium, Germany and Holland.

Prior to 1901 monobasic sodium phosphate was not produced in commercial quantities. About that time W. D. Patten of The Monarch Chemical Company, manufacturers of baking powder, discovered after considerable research that monobasic sodium pyro phosphate had great value as a cream of tartar substitute for baking purposes. Following intensive missionary work the baking trade was finally induced to adopt the pyro, and its use is now standard practice. It no longer has to be offered as a substitute for cream of tartar.

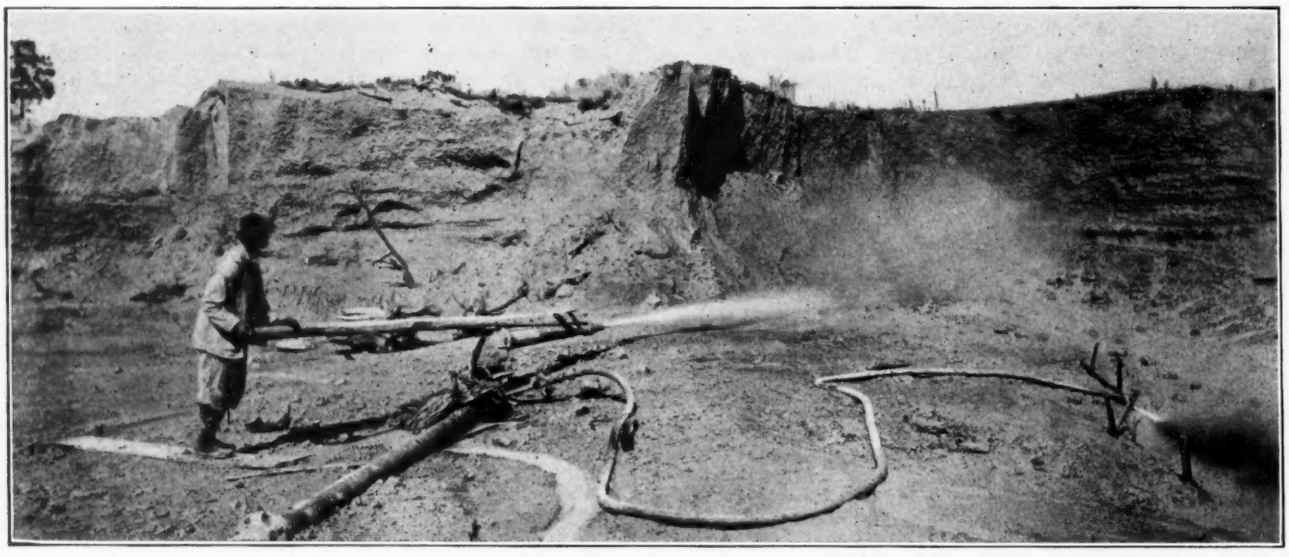
The leading baking powder manufacturer of Germany adopted Pyro, purchasing his supplies from the one manufacturer in the United States. Considerable quantities were also exported to England and Australia. This exportation, of course, ceased with the World War. After the War, both England and Germany established local plants for the manufacture of the Pyro, in consequence of which the export trade from the United States on this item has ceased.

Shortly after the establishment of the Warner Chemical Company, W. D. Patten approached Dr. Warner with a proposition to manufacture monobasic sodium pyro phosphate on a commercial scale. Dr. Warner was quick to see the possibilities of this new product and was the first and for many years the only manufacturer of this salt.

Dibasic sodium phosphate is supplied in three grades, i. e. anhydrous U. S. P., granular U. S. P. and granular commercial. The U. S. P. grades are used principally for medicines, including several well known proprietary remedies. The U. S. P. granular is also used in the manufacture of loaf cheese.

At least 85% of the total domestic consumption of the granular commercial is by the silk dyeing and finishing plants in Paterson, New Jersey and vicinity. The use in this field has greatly increased in the last three or four years.

Tribasic or tri sodium phosphate, as it is known in the trade, is perhaps the most widely used of the three salts. This was orginally marketed for treating boiler feed water and its use was limited. Eventually its



Mining phosphate rock, raw material of the sodium phosphate industry, at deposits of The Phosphate Mining Co.

great value as a household cleanser was discovered. Several progressive firms are pushing the product in packages under trade names and have built up wide distribution throughout the United States, more especially in the hard water territories.

Tri sodium phosphate is a valuable water softener and an emulsifier of grease. Its widest use is for general household and industrial cleaning, especially in cases where non abrasive material is desired. Large quantities are also used by hardware manufacturers, automobile plants, garages, restaurants, hotels, dairies, etc.

The laundry industry finds it most valuable to soften hard water and to remove stains. It is also a most effective paint remover when used in strong solution.

One of the pioneers in the sodium phosphate field was the late Dr. Lucien C. Warner, founder and president for many years of the Warner Chemical Company, and the circumstances of his entry into this field are rather interesting. Dr. Warner had made a substantial fortune in another line of business and had retired, devoting most of his time to travel. During some of his wanderings he learned of Connetable Island, off the coast of French Guiana. This island was composed almost entirely of phosphate rock. Thinking it would prove a good investment, Dr. Warner purchased the island and had the phosphate rock shipped to Carteret, New Jersey. Meeting with no success in selling the rock as such, he established the Warner Chemical Company for the purpose of converting the crude Connetable rock into phosphate products. The first of which were dibasic and tribasic sodium phosphate, neither of which at that time were used in large volume. Many years of intensive educational work among the consumers was necessary to place the products on a paying basis.

The other three of the group of four companies which were the original factors in sodium phosphate were the Bowker Chemical Company, the General Chemical Company, and the Grasselli Chemical Company. All came into the field with the growth of the silk industry at the beginning of this century. Previous to that time the silk producers had been forced to import all their di-sodium phosphate from Europe. In answer to their demands for a source of supply in this country these four companies were soon in the field of domestic production.

The next step followed quite naturally—the manufacture of the tri-salt from the same raw materials and with the same equipment as that used in manufacturing di-sodium phosphate. Having ample facilities for making the tri-salt, the next step was to find a market which would command an appreciable tonnage. The four producers plunged into investigations and research work in an effort to find a market and the result was the beginning of the use of tri-sodium phosphate as a so-called boiler compound, about 1910. That was the first step in developing the use of the tri-salt, which to-day, as a general industrial and household cleaner, is marketed at the rate of about 150,000,000 pounds yearly, thus surpassing its predecessor, the di-salt, by a tremendous margin.

These four continued to be the only producers up to and during the war, but at its close, about 1919-1921, they were joined by two others, the Victor Chemical Company, and the Federal Phosphorous Company. The latter is the only producer who varies the method of production chiefly because the plant was equipped for the production of ferro-phosphorus during the war. Consequently, that company uses an electrolytic or pyrolytic process for producing the phosphoric acid. After that, the process is the same.

Then for a time there was a period during which no additional producers came into the field. This was interrupted after about five years, and the past three years have seen new factors appearing in the market at the rate of one a year. The International Agricultural Corporation began production in 1926, the Blockson Chemical Company in 1927, and the most recent, the American Cyanamid Company, announced its entrance into the field in 1928.

One of the serious problems in connection with the manufacture of sodium phosphate is the disposal of the calcium sulfate residue. The Rumford Chemical Company of Providence, developed a process for converting this troublesome waste into synthetic gypsum building blocks and plaster. Two phosphate plants in the Metropolitan district have been licensed to use this process and are now so utilizing this by-product.

The increased production and manufacturing efficiencies effected in recent years have resulted in a steady decline in the prices of these salts, as shown in the following table:

	Tri Salt	Di Salt
1921	6½c to 7c	5c to 5½c
1922	6c " 7c	4¼c " 4¾c
1923	4½c " 5¼c	3½c " 4½c
1924	4¼c " 5c	3½c " 3¾c
1925	$3.88 " 4c	$3.38 " $3.75
1926	$3.90	$3.40 " $3.75
1927	$3.90	$3.25 " $3.55
1928	$3.90	$3.25 " $3.55

Production in the United States as shown in the Tariff Commission's report on sodium phosphate is as follows:

Year	*No. of Establishments*	*Quantity Pounds*	*Value*
1899		4,680,000	$155,989
1904		9,630,000	244,373
1909		24,580,000	540,282
1914	6	30,794,000	853,528
1917		26,610,000	711,283
1918		31,240,000	1,427,947
1919	10	44,702,000	2,438,917
1920		61,030,000	3,233,896
1921	13	56,428,000	3,052,952
1923	12	73,098,000	3,171,554
1925		158,688,000	5,758,488
1926	6	165,071,660	5,682,950

Sterilizing Seeds of Progress

If We, the People Break Faith and Destroy the Right of Intellectual Property by Breaking our Patent Contract with Inventors --- Who Will Pay the Bill?

By William M. Grosvenor

DURING the Ice Age when the glaciers crept down over most of the Northern Hemisphere; in the Middle Ages when the bubonic plague swept over Europe; during the World War when toxic gas was used as a weapon; many times, under many different circumstances, only human adaptability has saved the race or the nation. In modern times especially, this survival of the fittest depends upon the inventiveness of mankind.

Yet, as was pointed out in the preceding article*, our present economic organization increasingly favors the huge corporation and is increasingly antagonistic to the general promotion and best use of individual inventive faculties. Indeed, the history of the outstanding inventions of the past three decades—since the advent of big business—evidences this fact. A startling proof of this trend is seen in the decisions of our Supreme Court. Grave dangers to individual character, to good citizenship, even to our national and racial survival are indicated. To state the situation graphically, let us follow out these conclusions:

1. That fitness to survive depends on the wide and rapid adaptability of the nation or the race to its environment, evidenced largely by its fruitfulness in pioneering inventions, i. e. those which abandon familiar ways, tackle the impossible and make the miracle of yesterday the commonplace weapon or tool of to-day, thereby opening new levels of effectiveness to mankind.

2. That unless this inventive ability is fostered, a national crisis will find us unable quickly to adopt radical methods to meet the emergency and, therefore, unfit to survive.

3. That such inventions can not properly be expected to originate in or be fostered by large manufacturing corporations and do not in fact usually originate or develop there. This was indeed the fact shown by comparison of the number and proportion of important advances made by invention during the decades of 1890-1899, 1900-1909 and 1910-1919.

Outstanding Inventions Initiated and Developed

	U. S. Pats.	*By Large Mfg. Co.'s*		*By Independent Inventors*	
	Total	*Should have*	*Actually*	*Should have*	*Actually*
	Issued	*Increased*	*Increased*	*Increased*	*Increased*
1890-99	220,000	basis =	2+3?†	basis =	25
1900-09	300,000	2+7?	2	33	30
1910-19	380,000	4+9?	4+1?	43	17

This was to be expected and is not adverse criticism, of the large corporation. It is the natural action of this highly valuable and powerful tool invented to develop standardized and uniform mass production. Such ill effects, however, will become more acute and dangerous unless clearly recognized and counter balanced.

4. That the patent system was wisely provided for to foster just the needed counterbalancing effect; foster individual pioneering spirit. Authority was vested in Congress "to promote science and the useful arts by *securing* for limited times to authors and inventors, the exclusive rights to their respective writings and discoveries."

5. That the present system has become involved in contradictory and misapplied precedents fostered for the last thirty years by subdivision of patent appeals among eight (now nine) separate circuits with no higher appeal unless circuits differ on the same facts. The consequence is unfamiliarity of the U. S. Circuit Judges and Supreme Court Justices with patent suits. Patent practice has been complicated further by the unlimited legal skill available to large corporations, and by the enormous strides of science, until it is gravely questioned whether the actual operation of the system has not become a deterrent of individual invention and independent investment. This tendency is proved by the number and character of conflicting court decisions, including the controlling judicial authority in the land, the Supreme Court. It may even be questioned whether the present patent system has not become actually unconstitutional because it offers no real security to inventors and becomes a menace to the citizens' respect for "justice."

6. The Supreme Court, entrusted with the interpretation and application of the Constitution and all Federal Statutes thereunder, has refused, in 21 cases out of 24, to give the inventor even the benefit of the doubt which had been clearly proven to exist because two Circuit Courts of Appeals differed in their interpretation of the patent or the facts. Does this "secure" anything to inventors? As Dr. Fabian Franklin* so aptly expresses it, "This is not a question of technical jurisprudence, it is a question of fundamental statesmanship."

7. Startling lack of security of the inventor's rights is certainly not likely to result in any greater number of revolutionary inventions initiated by large manufacturing corporations. This follows, because pioneering wastes millions in efforts to develop and defend the "rights" which are likely to be finally denied and because frequent failure to "secure" produces years of uncertainty as to those "rights". A corporate entity, lacking the individuals sense of moral responsibility or personal shame, but having great power and vast means to buy brains for its self-protection, naturally tends to take rather than create. Glaring examples of this tendency already abound.

8. This failure to "secure" is certainly likely to result in fewer inventions of the revolutionary class being made by independent inventors and (quite as important) is very certain to prevent inventions being quickly and confidently financed as independent industries. The record of three decades cited shows this effect.

9. The people of the United States are already failing in many important cases to live up to their proposed bargain by which the inventor was induced to disclose his invention and investors were induced to put their time and money into its development. The more immediate consequences of serious and dangerous character following upon such failure are:

*Chemical Markets, Vol. XXIV, No. 1 (January 1929).
†Two certain plus three doubtful.

*A Question of Attitude. New York, Vol. 2, No. 25, June 23, 1928.

(*a*) Those who have been deprived of exclusive right to what they created are apt to feel better and revengeful scorn for the so-called "equity" or "justice" that appears to countenance the theft of intellectual property if, indeed, their technicalities do not actually foster, promote and reward such thefts.

(*b*) Approval by the Courts of an infringement which the owners know to be a steal causes the vicious change of ingenious, progressive citizens into potential crooks. They become actuated by the example of successful greed, or actuated by desire to defraud society of something, as a fair return for the rights to intellectual property of which they feel themselves to have been defrauded by legal technicality, judicial ignorance, or unfair prejudice.

(*c*) When such a miscarriage of justice does occur it cannot help fostering in some lawyers a willing disregard of those fundamental equities that belong to an inventor; a willing application of their skill in legal technicality or tactics and of their persuasive power or clever acting to the successful defense of infringers who find it cheaper to pay fancy legal fees than pioneering development expenses.

10. The pursuit of this path means vanishing individual inducement to invent and loss of the habit of daring inventiveness. Its end lies in the quicksand of foreign supremacy over this nation, if not annihilation of the race by some crisis of nature which develops a new germ or insect, or alters our climate, food or atmosphere.

Invention Necessary to Survival

If such conclusions are warranted by the facts, and if such conditions can be remedied, it is very much, very personally your business and mine. The world has recently completed a devastating war which proved one thing, if nothing else; that when national greed and prejudice feels that the survival of a nation is involved, a treaty is a scrap of paper and always will be. Self defense is nature's first law. There are also multitudes of germs, of insect species, and of other races that know nothing of treaties. In one way or another, other races are preparing, perhaps unconsciously, for the struggle. Already the war is on between man and plant parasites for the world's food supply and the outcome is far from assured. The war against bacteria seems for the present to be going well in certain limited directions only.

There is no use fooling ourselves like ostriches. Nature recognizes no "golden rule". Nature's rule is iron; keep fit or perish.

When any one, knowing the law of the land, dares brazenly to state in open Court: "No power on earth short of the Supreme Court of the United States can compel me to sign a license agreement or pay a royalty", should we not blaze with indignation? . . . . How should society classify that man?

Let us consider what, if any, remedies can be applied to this state of things.

Under the Constitution (Art. 1, Sec. 7, Par. 8) our patent laws must be made by Congress to "*secure to inventors the exclusive rights to their discoveries*". It is obvious to anyone familiar with patent decisions that this is *not being done*. For example:

> Nowhere in the United States Courts was it decided that Coolidge was not the first to *discover* a wire of ductile tungsten (for lamp filaments). Even though the three Circuit Judges could not agree (one dissented), did the inventor get the benefit of the doubt? No, the Court, after stating that the prior product "was more of a rod than a wire" and "was fragile and therefore not so serviceable", nevertheless held his product claims to "a wire formed of ductile tungsten" invalid on the technicality that ductility was a natural property of pure tungsten, and left him only his particular process protected. (28 Fed. (2nd) 641).
>
> Nowhere was it decided that Deppe was not the first so to carburet and warm an automobile manifold as to supply the whole of the modern hybrid liquid fuel ("gasolene") as a fixed dry gas to the engine. Yet the Court completely denied him protection for that discovery apparently on the technical ground that his invention, both process and apparatus, was limited to a particular part of the illustrative apparatus which had also been used in an earlier device proven to be inoperative. (21 Fed. (2) 44).
>
> Nowhere in thirteen years of litigation was it even questioned that Perkins was the first to discover furniture veneer glue, made of starch, better and cheaper than hide glue. The Supreme Court found that he was. Yet, it denied him practically all protection for that broad discovery, apparently on the technical ground that he claimed it broadly and showed only one way of making it, or that the inventor can properly claim only the particular individual thing he made and was not entitled to a monopoly on the new class of glue he discovered. (277 U. S. 245).

Where is the security in the exclusive right to their discoveries that Congress was empowered to create? Are we empowered by the Constitution to discourage inventions and discovery by beguiling inventors and investors into service, and then denying them the promised reward? Does that promote the general welfare of the United States? Are we not unintentionally defrauding ourselves of our birthright to faster, surer progress?

Security Under the Constitution

First: Let us as individuals recognize candidly that either the Constitution requires amendment, or else that every statute that tends to do otherwise than secure his exclusive right to the inventor is unconstitutional, as well as every decision that so interprets the statutes or that so interprets any set of circumstances which is doubtful. The Federal Congress and the Courts have properly no power or authority other than that vested in the Federal Government by the Constitution (Art. IX and X), and "general welfare" (1.8.1.) is certainly not promoted by false "security" and stunted development.

As descendants by blood or by adoption of those real men who staged the Boston Tea Party, who signed their death warrants in the Declaration of Independ-

ence and who executed their national will and testament in the Constitution of the United States, we owe it to them and to our own self-respect and to our children's heritage, to insist on one thing or the other; modify or enforce, no less.

Second: The American Manufacturers' Association and its subsidiaries, the Civic Societies, and the Better Business Bureaus, as well as the American Bar Association and the National Patent Bar Association, may well consider, whether their own welfare (if not their very existence for any extended period) does not require their careful appraisal of the situation. Is it not their most important obligation to their members and the public to educate both members and the public in the fundamental importance of the patent system ? Should they not urge and guide their members to demand intelligent revision from Congress and maximum security from the Courts ? Should they not teach the public as individuals to point the finger of shame and scorn at any individual or company who is found using a patent without right ? And when anyone, knowing the law of the land, dares brazenly to state in open Court: "No power on earth short of the Supreme Court of the United States can compel me to sign a license agreement or pay a royalty," should we not blaze with indignation ?

Henry Ford and Our Patent System

On January 17, 1928, Judge Tuttle in Parker vs Ford (23 Fed. (2nd) 502) found that "prior to January 1, 1917 the Ford Motor Company * * * * received and had actual knowledge of the patent in suit, and they concealed the knowledge of their infringement from plaintiff until September 9, 1930." "During the infringement trial, a defendant showed that its ravenizing process was a secret known only to three men, * * * * and that no other person was admitted to the room where the ravenizing solutions were prepared." "The defendant corporation, being one of the largest in existence, is doubtless made defendant in much unjustifiable litigation, and it may be good policy for defendant to make such litigation so expensive for its opponents that many intending contenders are deterred from bringing suits." "There seems to be no doubt but that defendant spent upwards of $200,000 in defense of this suit. The record shows too that Mr. Henry Ford who dominates the defendant corporation, is absolutely opposed to the operation of the present patent system and to the payment of royalties to anyone. This is clearly expressed by a statement made by Mr. Davis, defendant's patent attorney stationed at the plant. " 'There is no power on earth, this side of the Supreme Court of the United States, which would make Henry Ford sign a license agreement or pay a royalty.' With these ideas in mind, counsel for defendant were quite successful in causing plaintiff to expend large sums ($49, 933.07) during the infringement trial, * * * * * and substantially the same sum during the accounting, according to undisputed statements in open court. * * * * As a large portion of this expense was unnecessarily forced upon the plaintiff, $98,000 should be added to the $224,588.39 determined as reasonable royalty * * * * *."

This is a flagrant example of that dangerous tendency of big business to resort to a flood of expense to overwhelm opposition, however legitimate, by the bullying despotism of mere money. If a private individual were "unalterably opposed to the operation" of the law of the land and to paying for what things he took from others concealing their use and possession, how would society classify that man ? What are manufacturers association ethics, civic societies and better business bureaus but idle pastimes, when pratical business of that ilk can stalk unashamed across the country with its golden bludgeon in hand ? Are Bar Associations pointing with pride, or with criticism, to learned counsel who serve such means and ends of big business because it is big enough to pay handsomely ? Can these business, civic and professional organizations fail to recognize whither it tends ?

The Supreme Court has refused in 21 cases out of 24 to give the inventor even the benefit of the doubt which had been clearly proven to exist because two Circuit Courts had differed in their interpretation of the patent or the facts. What does this "secure" to the inventor ?

Third: Much can be done by the magnificent body of men who constitute our Federal judiciary. The facts at least can be forcibly presented for their consideration. Once carefully considered, the facts lead with mathematical precision to certain conclusions. These men are fine examples of dauntless courage even in the face of brutal lawlessness. They are men of keen intelligence. Only they are most of them not intimately familiar with natural laws (science) as embodied in industrial development. Give them individually as you meet them the benefit of your knowledge and view point, pointing out that they in effect are statesmen in their robes of authority, more than mere arbiters of a game of technical jurisprudence.

"Public Rights" and the Courts

The pity of it is that so frequently the courageous and broad-minded judge seems to feel his hands at least partly tied, either by his training in legal technicalities (often in conflict with equity) or by the law as "interpreted" by the over zealousness of Courts to protect "public rights" in previous cases. So he is led to do that kind of compromising and gentle justice which really protects thieves and penalizes honest industrious men. This really does the public far more harm than delaying for a few years its inevitable right to the free use of the disclosure when the patent expires. In the particular case above quoted the Court says:

"However, the fact that the defendant * * * * had actual knowledge that it was infringing the patent in suit

does not entitle plaintiff to recover damages or profits for the entire period of such knowledge. Proof is required to show that the defendant was notified, by the plaintiff, of the infringement and recovery begins only from the date when plaintiff gave the notice specified in Section 4,900 of the Revised Statutes, which was on September 9, 1920. Muther v. United States Shoe Machinery Company (21 Fed. (2nd) 773); Westhinghouse Electric and Manufacturing Company v. Conduit etc. Company (159 Fed. 154)."

Now Section 4,900 refers to patented *articles* which it requires shall be marked "Patent No.——" or else "no damages shall be recovered by the plaintiff, except on proof that the defendant *was duly notified* of the infringement and continued, after such notice, to make, use or vend the article so patented."

An article appears in the trade as a tangible silent thing in the hands of every purchaser who may desire to reproduce it, and it can serve no notice that it is patented unless so marked. That is one thing. A process is entirely different. It is not distributed broadcast in the trade except by publication of patents, by license proposals, or by the descriptions in technical and trade journals referring to the patent. It may be conceivably infringed in ignorance and then only with some excuse in equity if ignorance is proved. We are not, however, excused by ignorance of the law, which is no more generally published than are patents. Deliberate and above all carefully secret infringement is vastly different.

This Section 4,900 does not require that a patentee shall "mark" his process—how could he ? Nor does it say *by whom* notice must be given. Apparently the Court found that counsel for defendant had been notified by having purchased in 1916 before infringement began, the patent granted by the United States. What better notice and warning could there be ? In this instance, if the defendant was not notified by its own lawyers, defendant is to blame and why did it operate so secretly that the owners of the patent could have no knowledge of its infringement ?

Secret Infringements

Is it common sense or equitable to require that the inventor serve any further "notice" as to a process which apparently was copied from his printed patent, and was then so secretly used that the inventor, himself, could not know of the infringement ? Could one ask a better illustration of legal technicalities or precedents defeating justice, making mockery of the law and of common sense and saving a guilty party a considerable per cent. of its cost of defense ?* What excuse is there for decisions in "equity" giving the slightest benefit of any doubt, if it exists in the law, to some individual among us, the People of the United States, who are a party to a contract (patent) when that individual is caught filching away the only consideration of the other party (the inventor), particularly when that consideration was tendered and that contract made at our suggestion and mainly for our benefit.

All our conditions and considerations in that contract are secured, we prescribed the form and general limitations of the contract, and we reserved the power (in the Patent Office and the Court of Appeals of D. C.) to fix every term of that contract. No other contract so circumscribed is interpreted in favor of the offerer of the contract. We, the People, get our first consideration (filing fee) and our next instalment (issue fee) before the papers are sealed. We tax the inventor's income and the company's profits, and we get a public disclosure of the new idea and finally we secure its ultimate dedication to the public. We always "get ours." The United States Treasury takes the money. We, the People, haven't the remotest shadow of an excuse to take advantage of technicalities to crawl out of our bargain. If we do not like our lawyers (Patent Office) who corrected and passed the agreement (patent) let us pay reasonable salaries and get better service not welch on our bargain by some petty technicality of interpretation.

Needed -- A Patent Commission

Fourth: Not only does the attitude of our citizens, our lawyers and our Courts toward the fundamental rights to intellectual property require modification, but also the laws affecting intellectual property need intelligent revision, if the attitude of the Courts is to be modified without the long delay required to overcome the mass of precedent. Should Congress undertake the job ? The Congress of legislators provided for by the Constitution in 1787 was then adequate to consider and decide all questions requiring legislation, except international treaties which all the States recognized that Congress was only competent to ratify but not to frame. Even then Congress sought expert advice. To-day, it is recognized that there are many other subjects in which Congress is scarcely competent to do much more than ratify decisions of experts. Hence we have the Federal Trade, Civil Service, Interstate Commerce, Tariff, Immigration, Federal Reserve, Radio and other permanent or temporary Commissions. Boards or other bodies.

This is no reflection on the intelligence or ability of Congress. In 1787 these United States were almost wholly agricultural and trading communities and almost every man was something of a farmer and trader combined. All of the natural science then known could be studied, comprehended and used by one man. All of the manufacturing done in this country in 1790 would hardly exceed a few thousand tiny factories and 60 million dollars. Mining was practically negligible. To-day farm products alone from over six million farms exceed 12,000 million. There are nearly 200,000 factories, manufacturing products valued at 62,000 million. Mining of nearly a hundred different minerals totals about 6,000 million. Trade of all kinds certainly far exceeds 100,000 million. No farmer or business man can recognize and name even half of the natural materials

**Note*: Since this was written Judge Rellstab of the Northern District of N. J. (28 Fed. (2nd) 617) in Wagner vs. Corn Products has taken this common sense view and (ruled infringement and damages possible) in a case not filed until after the patent expired, because then for the first time secret infringement became known.

produced and traded in. No lawyer, doctor, chemist, or physicist knows even a considerable fraction of his general subject. No botanist, biologist, geologist, archaeologist, or astronomer pretends to knowledge of a majority of his more specialized science. No civil, electrical, mechanical, mining, railway, sanitary, or other specialized engineer pretends to know even his special field completely.

Congress would be the first to recognize that it would be foolish beyond comprehension and dangerous beyond measure for it personally to undertake the reconstruction of the patent system which vitally effects advances in all this vast and complicated structure. Those who have spent their lives in the study of the patent system are most cautious in advising changes, even though they most keenly appreciate the need for betterment. They realize that its framework and operation are vastly more subtile, far reaching, complicated, and important to this country's development, mental and industrial, than the tariff or freight rates.

Perhaps the most promising way would be to create a permanent commission composed about equally of representatives of the National organizations of farmers, chambers of commerce, manufacturers, bankers, scientific organizations, constitutional lawyers, and patent lawyers. Each of these representatives should certainly be selected first for his outstanding integrity and public spirit, and second, for his patent court experience as far as possible.

England tried such a commission plan and obtained a very logical and sanely progressive set of recommendations. If that Commission cost two million dollars a year for five years, its work would be worth vastly more to the country, offensively or defensively, or in the respect and patriotism of its better citizens, than a battleship costing ten to twenty-five million.

Canadian phosphate production in 1927 amounted to 151 tons with a valuation of $1,717; in the previous year 40 tons worth $800 were shipped. The 1927 shipments consisted of 113 tons of crude phosphate obtained from old mine dumps in the Provinces of Ontario and Quebec, and 38 tons extracted for experimental purposes in British Columbia. Imports of phosphate totaled 17,485 tons valued at $94,758, consisting of 56 tons from Great Britain and 17,429 tons from the United States.

British rayon industry is now producing at the rate of about, 51,250,000 pounds a year, compared with 25,500,000 pounds in 1926. During 1928 there was a tendency for exports to increase and for imports to decrease, imports being now about two million pounds per annum compared with over 10 million pounds in 1924.

Distillers Co., Ltd., London, forms subsidiary, Industrial Solvents, Ltd., to produce acetone, butyl alcohol, and acetic acid. Production is expected to begin within a short time at the plant which is now being constructed next to that of the parent company at Salt End, Hull.

Annual world production of superphosphate is estimated at 14,250,000 tons of which 61 per cent. is produced in Europe, 23 per cent. in America, 8 per cent. in Australia, six per cent. in Asia and two per cent. in Africa, according to French statistics.

U. S. Rayon Production for 1929 Estimated at 130 Million Pounds

Rayon production in the United States for 1929 is estimated at about 130 million pounds, as compared with about 100 million pounds produced in 1928. A detailed estimate of the 1929 production as compared with that of the two precedeing years is given in the following table:

	1929	*1928*	*1927*
Viscose Co.	66,000,000	54,000,000	41,000,000
Du Pont Rayon	24,000,000	19,000,000	15,100,000
Tubize	11,000,000	9,000,000	7,500,000
Industrial Rayon	6,500,000	4,500,000	3,450,000
Celanese	6,000,000	5,000,000	3,500,000
Amer. Bemberg	5,000,000	2,700,000	.....
Am. Glanzdoff	4,500,000	250,000	.....
Belamose	1,700,000	1,400,000	1,400,000
Acme	1,000,000	800,000	500,000
Delaware	2,000,000	1,500,000	500,000
Others	2,500,000	1,500,000	2,100,000
Total	130,200,000	99,650,000	75,050,000

The greatest increase in production is being made by the Viscose Co., which is by far the largest producer of rayon in the world. Estimated production this year is 66,000,000 pounds, against 54,000,000 last year, without including any production from the acetate rayon plant at Meadville, Pa. The size of the Parkersburg viscose plant is being doubled. This will give the company a total of 75,000,000 pounds production of viscose rayon.

American Glanzstoff Corp., which started production last fall, will get into its real stride this year with a production of more than 5,000,000 pounds of viscose rayon which later will be increased to 7,500,000 pounds annually, according to the "Wall St. Journal." American Enka Corp. is constructing a plant with a capacity of about 10,000,000 of viscose rayon with an ultimate production of 30,000,000 pounds annually. American Chatillon's new plant will have an initial capacity of about 2,000,000 pounds of acetate rayon and 4,000,000 pounds of viscose rayon.

Two years ago all companies in the United States with the exception of Tubize and Celanese were producing rayon by the viscose process. The production by these two companies totaled 11,000,000 pounds out of a total production for that year of 75,000,000 pounds. By the end of 1929 Tubize and Celanese will have a combined production of more than 17,000,000 pounds, while new plants producing other than viscose rayon will have additional capacity of about 17,000,000 pounds, making a total of 34,000,000 pounds of non-viscose rayon or as much as the whole industry produced five years ago.

This does not mean that the viscose process is becoming obsolete, since projected increase in viscose rayon production is larger than ever before, but simply that new uses are constantly being developed for all grades of rayon.

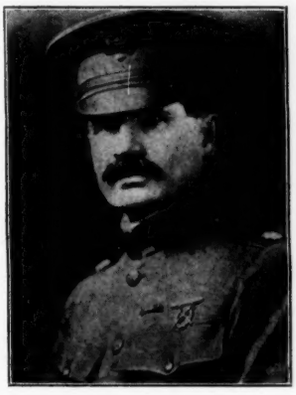
Glycol intended for the manufacture of explosives can be imported into Italy at the import duty applying to refined glycerin (32 gold lire per 100 legal net kilos), instead of at the duty applying to unspecified organic chemical products (39 gold lire per 100 legal net kilos), which applies to glycol for other uses, according to a ministerial decree of October 9, 1928.

Decision of U. S. Customs Court holding copper sulfocyanide duty free under paragraph 1565, is to be appealed by the Government which is contending for a duty as a chemical compound under paragraph 5.

Mutuelle Solvay, Belgium, in its first report as a public company, shows net profit of 61,966,928 Belgium francs. Dividend has been declared of 15 per cent. on share holdings valued at 96,652,018 francs.

Increasing imports of copper sulfate into India are attributed to increased use of that material for spraying rubber trees.

By Major General Amos A. Fries, U. S. A.
Chief of Chemical Warfare Service



THE use of chemicals in war is as old as organized warfare. From the days when the Athenians battled the Spartans for possession of the Grecian Peloponnese throughout classical times and the Middle Ages, irritant and poisonous substances have been used to break down the resistance of an opponent. Increase in mobility of Armies and the widening range of action gradually caused the primitive uses of chemicals to be abandoned. In the World War, however, the fighters again came to close grip and chemical warfare was reborn on a greater and more important scale than ever before.

Chemical warfare deals with the direct application of chemicals as weapons. It is concerned with the chemical not as an explosive agent to propel a bullet or fragment of metal, but as the active agent itself to cause casualties by irritation, burning, or asphyxiation, to make ground untenable, to screen operations or lessen the enemy's fire power by creating a smoke screen, and to damage enemy material or personnel by incendiary effect, or otherwise. In general, it accomplishes its object without destruction, except for its use as an incendiary. Men are put out of action, and made casualties for a sufficient period of time, without being maimed or suffering the after effects that result from thrusting or missile weapons, while ground, habitations, or vehicles are made temporarily unusable without being destroyed.

The adoption of chemicals as weapons was as logical as it was inevitable in a World War in which all the principal combatants were nations highly developed scientifically. When the German advance was halted by the Battle of the Marne both sides firmly intrenched themselves. A stalemate resulted — it was found that neither side could advance. The machine gun had increased fire power to such an extent that only by an impossible superiority in man power could ground be captured. Mobility for either Ally or German had gone. Under the conditions that existed in the winter of 1914 and 1915, with both sides out of artillery ammunition, the defender was bound to have a technical superiority over the attacker.

Both sides felt the need of a weapon that would search out the defender in his rabbit warren of trenches and holes and rob him of the protection of his sandbags and earth works. The scientist provided this weapon in chemicals, a weapon continuous in time and space. Thus modern chemical warfare was born.

Chemical warfare proved itself from the start. But for the failure of German high command to recognize its power the Germans might have gained the decision in the Spring of 1915. Again with the introduction of mustard gas another opportunity was missed due to the same reason. The orthodox military mind of the German did not possess the necessary imagination to grasp the effectiveness of the weapon that science had provided. The result was that the tactical application was faulty.

Nevertheless, gas did its work in the War, for it accounted for some 800,000 casualties divided approximately as follows: Russia 275,000; France 190,000; England 181,000; Germany 78,763; United States

70,552; Italy 13,300. Note that nearly one-third of our American casualties were caused by gas. Hanslian in "Der Chemische Krieg" states that in nine months, January 1st to September 30, 1918, there ware 58,000 gassed in the German Army. In the first ten days of August, 1918, according to the same authority, the French suffered 14,578 men gassed. This after protection had been standardized. Yes, gas did its work and no one denies that it did it effectively.

The chemical agent is a universal weapon for it is adaptable to all arms. It is an efficient auxiliary in every operation. Its use must be considered possible in every tactical situation.

Ten years have now passed since the close of the war and the return of our great armies with the demobilization of our World War forces; however, there has been no letting up in the study of Chemical Warfare materials. The necessity for protection against chemicals in future wars is fundamental. The individual must not only be protected by a gas mask, but he must be clothed in protective clothing to keep out or neutralize vesicant chemicals such as mustard gas. At the same time he must have equipment that will permit him to fight and work with as little handicap as possible.

Ten years research in protection has developed the diaphragm mask which can be comfortably worn and does not materially effect fighting efficiency.

Although the World War mask was an excellent one and gave adequate protection against the gases used up to the close of the war, it was very uncomfortable, unduly cut down the soldier's efficiency and did not protect against certain chemical agents when projected by new methods which were just being developed at the time of the Armistice.

Tremendous progress has been made in gas mask research and the mask of to-day is as different from the mask of ten years ago as the present rifle is from the musket of Civil War times. The uncomfortable rubber mouthpiece and painful nose clip of the wartime mask have been abandoned and the new facepiece relies on an improved design which gives an air-tight and snug fit. A device patterned after the French Tissot mask prevents fogging of the eyepieces, passing the inhaled air as it comes cool from the outside, up across the eyepieces. Recent developments have increased comfort by decreasing the resistance to breathing, a matter of primary importance. At the same time, protection has been increased by improvements in the absorbents and by changes in construction. Better vision is obtained in the latest type with its non-breakable lenses of two-ply glass and much clearer and louder voice transmission is permitted by a diaphragm so that commands may be given and verbal messages transmitted clearly and without difficulty.

To sum up, it may be stated that the result of ten years research in protection has developed a gas mask that is second to none in the world to-day; a mask that will protect against all known gases that could conceivably be used in battle—a mask that can be comfortably worn and which does not materially affect the fighting efficiency of troops.

For years there has been sought a weapon for projecting smoke and chemicals that would be superior to the 4″ Stokes Mortar developed by the British during the war and used by our chemical troops. The 4″ Stokes Mortar designed to lay down large quantities of chemicals easily and without special preparation was the largest caliber weapon that could be fired rapidly and yet be mobile. Its range is 200 to 1,200 yards. Rapidity of fire helps to compensate for inaccuracies in laying or operating under field conditions. The mortar can fire up to 20 rounds per minute for one or two minutes with an average rate under sustained fire of 10 to 12 rounds per minute. One chemical company with eight mortars can easily lay down 6,000 pounds of chemicals on an area in one minute. It has general application and is especially effective against small definite targets for casualty effect or for the production of blanketing smoke.

The improvements sought for this weapon are greater mobility, increased range and accuracy. These must be attained without sacrificing ease of operation and ability to lay down large concentrations in a short time.

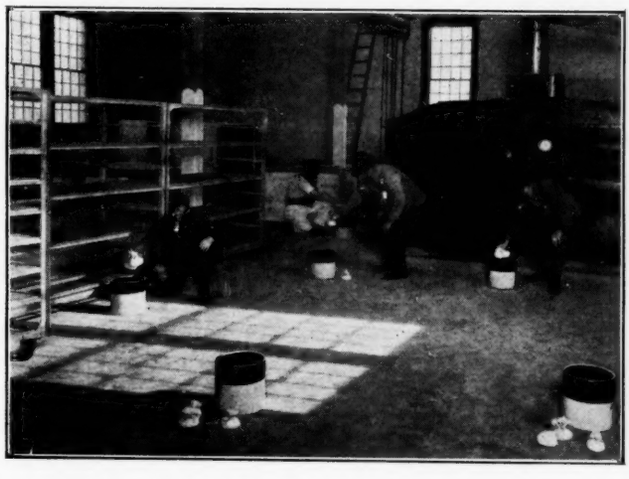
The 4.2″ Chemical Mortar developed by the Chemical Warfare Service appears at last to have accomplished all these things. It resembles the 4″ Stokes Mortar in general. It is a great improvement over the older weapon. The difference in caliber results from rifling the 4″ Stokes Mortar and in the rifling lies the main difference from the former type. The new weapon has a range of 2,700 yards—more than double that of the Stokes Mortar—will deliver a greater amount of smoke, gas or high explosive and being rifled has much greater accuracy. Mobility has been increased by constructing light yet rugged carts that can be drawn by men or animals.

During the past summer a platoon of chemical troops was attached to the experimental mechanized force which operated at Fort Leonard Wood, Md. This platoon was equipped with the 4.2″ Chemical Mortar and tested it in the field over a period of four

months. It has proved to be quite equal to the promise shown by preliminary experiments and will extend the use of chemical troops two to five fold.

Probably one of the best known contributions to military art and one of paramount importance, is the work done since the war by the Chemical Warfare Service on the dispersion of chemical smoke from airplanes by spraying. Equipment has been completed and tested which makes it possible to project smoke clouds from airplanes flying at a speed of 150 to 250 miles an hour. The plane lays a cloud about a mile and a quarter long in less than a minute. These smoke clouds may be used to blind the enemy or to screen operations from enemy observation. The smoke curtain produced is dense and impenetrable and hangs in the air for a considerable period of time depending upon the wind conditions. During the past year four pursuit and three attack airplanes were equipped with the latest type apparatus for the production of smoke screens and were employed in demonstrations and maneuvers given at half a dozen Army Service Schools.

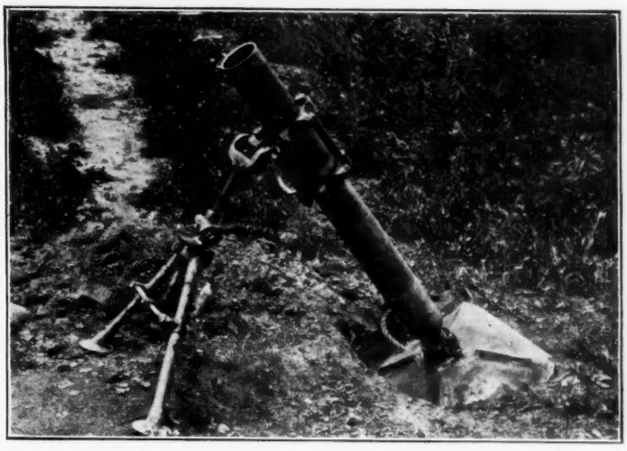
The first gas attacks were made by releasing chlorine contained under pressure from steel cylinders which weighed in the neighborhood of 200 pound when filled. A vast amount of labor and preparation was required for the installation and consequently the cylinder attack was relegated to a position of minor importance during the last half of the war. By the cylinder method, however, high concentrations of gas in vapor form can be made to cover any desired front with little or no warning and under favorable weather conditions there are many advantages in this form of



All of the work of the Chemical Warfare Service is not military in nature. Here is an army bakery being fumigated with cyanogen chloride.

attack. The disadvantages of the older heavy cylinders led to the development of a light one-man portable cylinder of high efficiency. The Chemical Warfare Service now has a portable cylinder which weighing 48 pounds will contain 30 pounds of chemical. For the weight of gas contained, this is the most mobile of the gas weapons.

The tank with caterpillar traction is now attracting considerable attention both in this country and abroad. With its development has come a requirement to provide it with a device for projecting smoke. Such an apparatus has been designed and several have been made up and tested by the using Service. These tests show that the smoke apparatus for tanks



The 4.2" Chemical Mortar is the most recent development in projecting smoke and chemicals. It has a range of 2,700 yards.

is practicable and necessary and it may be said so far as the technical work of projecting smoke from tanks is concerned, the problem is satisfactorily solved.

In addition to the military developments, there have been important results obtained in developing valuable materials for peace time use. Important advances have been made in the control of the boll weevil. More than 1,000 poisons and poisonous mixtures have been investigated by the Chemical Warfare Service including chemical warfare agents used during the war. Two compounds have been discovered which promise to be at least as effective and less dangerous than the standard poison used—calcium arsenate—and with proper manufacturing development, will be materially cheaper. Moreover, fundamental facts applicable to the whole question of insecticides and fungicides have been learned.

Frequently the Chemical Warfare Service is called upon for assistance in eradication of all sorts of pests. Aid has been requested in the eradication of mosquitoes, rats, rattlesnakes, prairie dogs, hairy seals, bats, black birds, fleas, moths, bedbugs, and other vermin. Aside from the boll weevil investigation, no funds have been provided by Congress to carry out research in this direction. The Chemical Warfare Service has been very limited in the amount of time that could be devoted to this research; nevertheless, careful consideration has been given and frequently the advice furnished has assisted materially in overcoming the particular pest.

The control of the marine borer which destroys docks, pilings and waterfront structures of wood and causes a loss of at least a million dollars a year, seems to be in sight. The studies of the Chemical Warfare Service have resulted in finding that the derivatives

of certain of the war time chemical agents offer great promise as impregnating material for the wood. Test blocks impregnated with the best toxic agents have now been exposed for over three years and show no marine borer attack whatever.

The waste and delay and loss of time caused by the growth of barnacles and other marine organisms on ships' bottoms has also been the subject of investigation by the Chemical Warfare Service. The advantage of a paint that can be applied to the bottom of ships to prevent the growth of the many forms of marine life which attach themselves there, is obvious. Although the problem has not yet been solved, the Chemical Warfare Service has developed a paint which on exposure to marine growth has, on a small scale, given excellent results. It is now being subjected to service test on the bottoms of several destroyers. The value to commerce as well as to national defense of the success of ship bottom paint is incalculable.

The Chemical Warfare Service has a tremendous responsibility to the nation. This small section of the Army is the only insurance against chemical attacks possessed by America. Research, therefore, is a daily requirement for the Chemical Warfare Service. It is necessary to guard against the chance that some potential enemy may discover an agent against which no protection has been developed for our Army. The only way that this can be done is to investigate every possibility and to continue everlastingly at research. With time, protection against any agent can be developed but it is certain that if new agents are used by an enemy, the development will be secret and full power of the weapon will not be realized until it is too late. It is essential then that the military mind keep pace with scientific knowledge and apply it intelligently to the study of war.

Societa Belge Ammoniaca Sintetica a Derivati is formed by Montecatininad Belgium Copper Co., to exploit Fauser process of nitrogen fixation in Belgium. Company plans four units: one at Wilebrosck, Belgium with 10,000 tons ammonia capacity per year which is soon to be doubled; at Harlem, with 27,000 tons capacity; at Sluiskil, Holland, with 45,000 tons capacity; and one in Central Belgium, using gas from coke ovens.

L'Ammoniaque de Lieven is formed in France with capital of six million francs, to work in conjunction with Lieven coal company to produce ammonia by Claude process. Ovens dealing with 2,000 tons of coal per day have been built.

German Potash Syndicate sales for 1928 amounted to 1,421,378 metric tons K_2O, an increase of 15 per cent. over the 1,239,646 tons in 1927; and of 29 per cent. over the 1,099,740 tons of 1926.

Exports of phosphates from Morocco amounted to 1,137,100 metric tons in 1928, an increase of 139,094 metric tons over 1927 and a 50 per cent. increase over 1926.

Ammonium sulfate exported from Great Britain amounted to 393,422 long tons in 1928, an increase of about 50 per cent. over 1927.

I. G. Farbenindustrie is marketing an anti-freeze mixture called "Glysantin" consisting of 100 per cent. ethylene gylcol.

Who's Who In Chemical Industry

Albin, T. C., chemical engineer, Forest Products Chemical Co. Born, Vinton Co., O., 23 May 1882; mar., Kittie M. Taylor, Columbus, O., 2 Jan. 1900; children, 2 sons, 2 dau.; educat., Ohio State Univ., 1899-1900. Columbus Iron & Steel Co., asst. chem., 1901-03; Commonwealth Steel Co., Granite City, Ill., night chem., 1903-04; Sligo Furnace Co., Sligo, Mo., chief chem., 1904-10; Cranberry Furnace Co., Johnson City, Tenn., chem. & engr. 1910-12; Charcoal Iron Co. of Amer., Manistique, Mich., chief chem., chem. plant supt., plant mgr., 1912-26; Ford Motor Co., Iron Mt., Mich., engr. & chem. plant supt., 1926-27; Forest Prods. Chem. Co., chem. engr., Aug. 1927 to date. Specialized on wood distillation. Memb., Amer. Chem. Soc., A. F. & A. M. Address: Forest Products Chemical Co., Memphis, Tenn.

Aldridge, Walter H., president, Texas Gulf Sulphur Co. Born, Bklyn., N. Y., 8 Sept. 1867; mar., Maud Miller, Oakland, Calif., 18 March, 1914. Children, 2 sons, 1 dau.; educat., Columbia Univ., Y. Y. engr. of mines, 1887. Columbia Univ., trustee. Lead & copper min. & met. Prod. sulfur & marketing. Memb., Down Town Assn. Clubs: Columbia Univ., Union League, Apawanis, N. Y. Athletic. Address: 41 East 42nd Street, New York City.

Thompson, Charles Thiers, president Thompson-Hayward Chemical Co. Born, Tinton Falls, N. J., 21 Apr. 1887; mar., Marion Ellis Moreau, 31 May 1914, Freehold, N. J.; children, 2 sons, 1 dau.; educat., Rutgers Coll., 1908; Bachelor of Letters —Vanderpool Fellow Chem. Rutgers Coll., 1909. A. S. Barada & Co., partner, 1911-17; Thompson-Hayward Chem. Co., pres., 1917 to date. Clubs: Mission Hills Golf, Kansas City, Delta Epsilon Frat.; Lions. Member other civic organizations. Hobbies: antique furniture, bridge, outdoor sports. Address: Thompson-Hayward Chem. Co., 2915 Bullene Ave., Kansas City, Mo.

Turner, Joseph, partner Joseph Turner & Co. Born, Everton, England, 13 Aug. 1870; mar., Georgette Gemel MacKay, New York, 1899; children, one; educat., private schls., U. S. and Europe. In 1881 with F. L. & D. S. Riker continuing with them in various capacities from office boy to genl. mgr. until 1922, when succeeded by Joseph Turner & Co. Clubs: Ridgewood Country, Drug & Chemical. Hobbies: business, fishing. Address: 19 Cedar St., New York City.

Van Schaack, L. L., treasurer and sceretary, Van Schaack Bros. Chemical Works, Inc. Born, Chicago, 23 June 1892; mar., Myrtle Berbert, New York, Aug. 1920; children, 2; educat., Harvard Univ., 1913. Van Schaack Bros. Chem. Wks. Inc., treas., secy., 1914-28. Memb., Amer. Chem. Soc., Amer. Soc. Test. Matls. Clubs: Univ. (Chicago), Harvard (N. Y. and Chicago). Address: Van Schaack Bros. Chemical Works, Inc., 3358 Avondale Ave., Chicago, Ill.

Weiss, Morris L., vice-president and director research, Dovan Chemical Corp. Born, Russia, 8 Jan. 1887; mar., Bessie Munves, New York, 25 Nov. 1917; children, 2 daus.; educat., Cooper Union, N. Y. grad. chem., 1913; Poly. Inst., Bklyn., N. Y., B. S. Chem., 1916. Harriman Res. Lab., Roosevelt Hosp., N. Y., asst. in res., 1913-16; Republic Rubber Co., Youngstown, O., res. chem., 1917-20; Dovan Chem. Corp., N. Y., vice pres., in charge research, 1920 to date. Patents on organic accelerators for the vulcanization of rubber. Memb., Amer. Chem. Soc., Soc. Chem. Ind. (Eng.), German Chem. Soc. Hobbies: literature, music. Address: Dovan Chemical Corp., 441 Riverside Ave., Newark, N. J.

SMALL PLANT EFFICIENCY

By Joseph F. Hollywood
Sales Manager, Peerless Color Company

Large scale production has become almost a synonym for efficiency and certainly is generally accepted as meaning high rate and low cost production. It comes as something of a shock, therefore, to find that the little manufacturer, on the average, is producing more goods at a lower cost than the big corporation. Out of an experience dating back to the hectic days of the war, Mr. Hollywood points out this truth with specific reference to the dye industry

IT takes science, or at least the scientific method, to disprove an old and generally held fallacy. As long as my memory goes in business, it has been held by many business men that the height of inefficiency was the usual achievement of the small producer. Conversely, the nth power of all that is good and perfect in the way of production is the private property of the big operator.

"How can you compete against the big fellow ?"

You've heard that question asked if your associations have been with the small unit. It expresses a conviction of many. It is generally held and sometimes its truth is aggressively argued by its adherents. Yet the scientific method, working through two engineers, has proved its falsity.

Two engineers, Alford and Hannum, carrying their investigations through scores of industries, and through thousands of individual plants, have demonstrated scientifically that in many cases the small manufacturer is far more efficient than his larger brother. Their findings regarding small manufacturers were really a by-product of their main effort, and the results as they apply to the small maker were just as surprising to them as they will be to large numbers of bankers, business men, experts, etc.

They invented a new measuring stick which they call the Kilo-man-hour. To obtain a measure of the efficiency of an industry, or of a unit of an industry, they measure the value of its production in terms of K*M*H. The quotient expressed comparatively gives you the efficiency of your industry or your plant.

The results as they apply to small plants, as described in one of the New York papers recently, are so interesting that I quote the paragraph in full:

Smaller Plants

In another respect engineers have been astounded by one of the discoveries resulting from the use of the new yardstick. This phase of the findings seems to show that the belief that small plants are economically inefficient is a serious mistake. Engineers and other experts in industrial management have long contended that the little plant was wasteful and bankers have taken the same view, but Alford and Hannum have discovered that the little manufacturer, on the average, is producing more goods and at a lower cost than the big corporation. In 35 out of 53 different industries the smallest company in the lot was found to have a higher rate of production than the largest company. In 16 out of 53 industries the smallest company was found to have the highest rate of production of all. Conversely, the largest company had the highest rate of production only in three industries.

These facts are revolutionary. They may explain why the little shop continues to exist despite what has been supposed to be the obliterating competition of the great corporations. One engineer commenting on this remarkable reversal of present theories pointed out that it might show that there was no need of the many laws enacted to prevent monopolies, because after all the little manufacturer, being most efficient, may still be able to undersell his great competitor.

Whether the investigation has covered the chemical field or not, I do not know, but it serves to emphasize a fact long known by many in this field that small units are just as efficient, just as capable of success as large ones.

In my own experience, which of course, has been largely confined to the smaller manufacturers of dyestuffs, I have become acquainted with a number of successful small manufacturers. They have been and are successful from the standpoint of moneys earned, products increased, both pounds and variety, and from the standpoint of the general welfare, by producing dyes and chemicals never before made by American manufacturers, and in some cases never before made by any manufacturer anywhere.

While it is true that we have had our casualties amongst small manufacturers of dyestuffs, the reason is not size. Small manufacturers did not go under because of size contrary to the popular notion on that score. The reasons here are the same as you'll find listed in Dunn's or Bradstreet's for general business casualties. Incapacity, insufficient capital, etc., the well known wreckers are there in person at every wreckage—chemical or otherwise.

Take a few cases in point. I know a small manufacturer who was wrecked because he was compelled

to proceed at full speed even when the warning signals were set against him. The result, naturally, was a smash up. Another I know who came to a fatal end after a long life in the business, who was really by his very organization foredoomed to failure. The only thing that could save him was a continuance of the joy-riding conditions of the war and short post-war boom periods. Another whose only interest in the business was to exult over the very fat profits which were really artificially maintained. Who didn't have common sense enough to know that fat profits draw the envious eyes of hungry competition. And others, whom I shall pass over. And yet when the crashes came, what did you generally hear? "Well another small fellow is gone! I tell you a little fellow can't compete!"

Let me give you the other side of the picture. A small concern I know has made a healthy profit on its investment ever since its organization. Another one shows a profit yearly. I don't know the amount, but its large enough to satisfy the investors. Another one I was acquainted with in one year of its existence made what would be considered even in these days a generous profit. When I mentioned that to one of the big fellows he couldn't conceal his amazement. Of course, the little fellow was employing ordinary common business sense at the time. The big fellow and some others were playing the very edifying but very expensive game of squeeze-out. And the result was a squeeze-out of their profits. Proportionately, I would say there are just as many small makers making money year after year as large ones, without any swollen millionaires in either class.

Take these very important factors: Age, variety of product, product made for the first time in America. How do the little fellows compare with their big brothers?

Tenacity of the Small Plant

Many of the little fellows are older in point of years than their bigger brothers. Practically all have been in business for ten years or more. They withstood the extreme changes of the last ten years and show tenacity which argues well for their continuance.

The little fellows make all variety of dyes. They are represented in every class. Direct, basic, acid, chrome, developed, vat, alizarine. You even find them manufacturing such highly competitive dyes as direct black, acid black, direct blue, sulphur black, sulphur blue, etc.

Many important dyes were first made in America by small manufacturers. Alizarine, primuline, fast light yellow, phosphines, developed blacks, malachite and brilliant greens, are some of the important ones. Many were made so well that the large manufacturers took a long time to catch up. A point in case, is direct black. A fine, clear type of this was made for a long time exclusively by a small maker. A great many important dyes are made only by small makers to-day, so you see in all of these important departments the small man compares favorably with the large one.

It is my opinion while men remain as they are we shall have the small successful manufacturer as well as his larger successful brother. The variety of problems offered by the small manufacturer will always appeal to a certain class of men, while the special lines of effort offered by the large maker will always have its appeal to another group. On the whole, however, science and common observation seem to agree on the fact that head size and not plant size is the governing factor in success.

The Industry's Bookshelf

Modern Conceptions of Electricity, by Charles R. Gibson, LL.D., F.R.S.E., 284 pages, J. B. Lippincott, Philadelphia, $5 00 net.

Present conceptions of electrical phenomena are presented here in such a fashion as to give the ordinary bystander an idea as to what is happening. It is quite a revelation to find that it is quite possible to form a definite understanding of the Theory of Relativity and the Quantum Theory, after reading this book It should interest those who have not the time of the inclination to study the technical books dealing with electrical phenomena.

Corporation Finance, by Edward Sherwood Mead, 358 pages, D. Appleton & Co., New York, $3.00 per volume.

The fact that this is the sixth revised edition since the first publication of the work in 1910 speaks for itself. This, its latest appearance, is made in two volumes. Volume 1 confined to regular operations of the corporation, leaving special subjects, such as expansion receiverships, consolidation and reorganization, to the second volume. Forms a clear and illuminating exposition of practical interest to the business man.

American Soap Maker's Guide, by I. V. Stanley Stanislaus and P. B. Meerbott, 709 pages, Henry Carey Baird & Co., Inc., New York $10.00 net.

This weighty tome may well be the most complete work on soap and soap products published in the United States in recent years. Its two outstanding features are its cognizance of the changing trends in raw materials in this industry, and the new methods made possible by constantly improved equipment. It is well illustrated and heavily charted, and should prove an invaluable handbook for all those in the soap and allied products industry.

Manufactures, by W. F. Rocheleau, 222 pages, A. Flanagan Co., Chicago.

This book is one of the Great American Industries Series whose object is to acquaint all Americans with the extent of their country's resources. Although written for the youth of the nation, its instructive, interesting and non-technical treatment makes it a welcome addition to anybody's reading.

Organic Laboratory Methods, by the late Professor Lassar-Cohn, translated by Ralph E. Oesper, 469 pages, The Williams & Wilkins Co., Baltimore, $6.50 net.

A translation from the German dealing with the general operations of laboratory technique such as distillation and crystallization.

HOW LONG

Will Prosperity Last?

By C. F. Roos

Never before has industry given itself over so completely to plotting charts and curves in an effort to transact present affairs profitably and approach future ones on a scientific basis. Although this careful study of "trends" undoubtedly is of value, yet it is interesting to learn from an economist, who is also a mathematician, just how far such curves may be trusted in determining future prosperity.

FOR four successive years the people of the United States have lived in a steadily increasing prosperity, uninterrupted by severe industrial reactions. It is true that there have been business failures, but these have been of a minor nature and have not endangered our general prosperity. Production has had its usual seasonal fluctuations, but the swing from the high point to the low point has been less emphatic than formerly. After recovery from these short depression periods orders from the trade have invariably lifted volume of production and distribution to new high levels.

Bankers and business men are beginning to wonder if these conditions will continue and if it is scientifically possible to forecast business conditions. In answer to an ever increasing demand various new and sometimes extraordinary methods of forecasting have been devised. Unfortunately, many of these methods are not nearly so scientific as that which Professor W. S. Jevons advocated. After estimating the average period of a business cycle to be 10.44 years and quoting estimates of the sun-spot intervals to be 10.45 years, he concluded: "Judging this close coincidence of results according to the theory of probability, it becomes highly probable that two periodic phenomena, varying so nearly in the same mean period, are connected as cause and effect". According to this curious theory the depression period is already over-due.

Just as a human being is helpless without life, so is the quantitative business analyst helpless without an economic theory, or a knowledge of crystal gazing. Although such a theory may not be perfect; although it may assume perfect control of conditions, that is, that all phsychological and other influences in our business system can and have been measured, and although it may need much over-hauling, nevertheless, the forecaster must have a theory. Any theory which is to be of service must be able to explain existing phenomena and predict new ones. In the case of economics it seems that the kind of a theory which can best do this is a mathematical one. It is true that theories which are not mathematical are valuable, but the mathematical theories have marked advantages in the definition and analysis of concepts and in the discovery and presentation of a general view of the economic field.

Many bureaus of economic forecasting are endeavoring to render an honest business service by plotting mathematical curves of existing economic data and extrapolating to foretell future conditions. To the unsuspecting this might seem to be a correct scientific procedure, but such is far from being the case. If we fit a curve to existing economic data, we can certainly expect it to explain that data, but can we hope to use it to forecast new phenomena ? The obvious answer is that we may provided that we have taken all of the influencing factors into account. In particular, if we knew that the demand for copperas depended only upon its price, we could gather sufficient information in the form of prices of copperas and total sales of copperas at these prices to enable us accurately to describe the relation existing between demand and price of copperas. Unfortunately there is a joker present. The demand for an article depends upon the time, the rate of change of price, the rate of production of the article and other factors (psychological and otherwise) as well as upon the price. Since it is obviously impractical to plot a curve in more than two dimensions, the graphical method of forecasting is at a disadvantage at the beginning.

Until economists discarded the idea that a change in the price of one article "caused" a change in the price of a second commodity and the change in the price of the second commodity afterward "caused" a change in the price of a third commodity and so on, the whole economic system seemed to be in utter chaos. If the price of railway transportation be a cause of the price of cotton, how can the price of

cotton in turn be a cause of the price of railway transportation ? Again, if the price of para-aldehyde depends upon the price of coal, how can the price of coal depend upon the price of para-aldehyde. If such were the case, the whole problem of pricing would appear to be insoluble, for, either all prices would become zero or very large indeed. In 1873 a mathematical economist, Leon Walras, came to the rescue and wrote that the price of any one commodity depended upon the prices of all other commodities, and by the mathematical theory of simultaneous equations showed that the price problem can be solved. Walras was thus able to view the interrelated factors in exchange, production and distribution in a way comprehensive enough to give a true insight into the complexity of our economic system. By giving such a survey he paved the way for subsequent applications of the quantitative or measuring method to the problem of measuring the relative strength of the different economic forces which are constantly at work. Thus, Walras made it possible to show that although the price of shoes depended upon the prices of all commodities and services known to mankind, the prices of all commodities and services except the prices of leather, nails, cotton and the price of manufacturing shoes could be safely neglected.

Moore's Theory

To bring the general theory of economic equilibrium into agreement with economic facts as we observe them it is necessary to pass from the statical, hypothetical equilibrium of Walras to a realistic treatment of an actual time equilibrium. In 1926 Professor H. L. Moore of Columbia University gave an empirical time theory of equilibrium and made it possible to obtain concrete, statistical demand, supply and other related time curves and to measure the changes of these curves from time to time as a result of dynamical changes. Professor Moore replaces the assumption of Walras that the prices of the various commodities and services in the economic system are constant by the assumption that they depend upon the time, and by means of a system of algebraic equations shows that it is possible to solve for the various prices of the system in terms of the time.

Professor Moore's theory would seem to justify the present practices of plotting curves showing how prices, demand, etc. depend upon the time and using them to forecast new prices, demands, etc., but again I must make the objection that there are some very important elements which have not been taken into account. For example, there is no consideration of the fact that purchasers watch not only the present level of prices, but also the direction in which these prices are changing and are expected to change. To neglect this element is to say that no one seriously considers an advertisement of the type "Prices greatly reduced for clearance". Again there is no account taken of the fact that there is an increased demand for certain commodities when prices are rising. This phenomena caused Professor G. C. Evans of the Rice Institute to introduce the rate of change of price into the demand equation, and develop a dynamical theory of economic equilibrium which in some respects was even more general than the subsequent theory of Professor Moore. Although Professor Evans' theory was more concerned with describing the flow of commodities and prices than in making it possible to forecast business conditions, it has, nevertheless, been the real starting point of a more recent and apparently more valuable theory which seems to shed some real light upon many important problems of business forecasting. This new theory makes it possible theoretically to predict such things as prices, demand, production, etc., and points out that it will probably never be possible actually to predict these quantities since small psychological influences which do not seem to be measurable can completely upset all calculations. The new dynamical theory simply tells us not to try to do long time business forecasting. It places the problem of predicting when prosperity will change to adversity squarely up to the psychologist and challenges him to rid our economic system of psychological influences or furnish us with a means of measuring them.

The new theory makes it possible to view the whole economic situation and tell what the effect of changes in interest rates, cost of production, demand, overproduction, etc. will be. Many problems of a fundamental nature which could not even be touched by Professor Moore's theory now appear theoretically simple. For example, it is possible for the first time to tell theoretically at what rate of production and for what period of time a mine or other property should be operated in order that a maximum profit result to the operator. Again, it is now possible for a manufacturer to tell at what rate of production a machine should be operated, the time at which it should be replaced by another machine, the rate of production of this replacement machine and the time at which it should be discarded in order that a maximum profit over the whole interval of time of operation result to the operator.

A close examination of the new theory shows that it can cope equally well with the problems of forecasting for monopoly, co-operation and competition. For definiteness, let us suppose that there are twenty manufacturers of sodium bicarbonate, and that all of the twenty are competitors. If all of them agree to submit their accounts, it is possible theoretically to determine the best price for their commodity and the rate of production of each producer on the assumption that each will desire to make his profit as large as possible for some period of time which need not be the same for all producers. From a mathematical or scientific point of view the problems of competition are the most interesting since they include the corresponding problems of co-operation and monopoly as special cases. Thus, the monopoly problem is the competition problem when there is only one producer.

Again, in the co-operation problems groups of producers act as a single producer. For these reasons we need only consider the problems of competition.

Problems of Competition

The first assumption necessary for formulating the new theory of competition is that each individual engaged in business is motivated by an attempt to make his net profits as large as possible for a particular period of time which he may choose. To do this he may find it desirable to suffer a loss for a portion of the time in order to secure greater profits at the end of the period, but at any rate such a producer is interested in securing a large net profit for a certain period of time. In any actual problem the cost of production per unit of output, the rate of demand, the rate of interest and other quantities which influence this net profit will not remain constant over long intervals of time. This will require that the period of time be short since as soon as a producer recognizes a change in any of these quantities, he will abandon his old schedules of production and prices and start trying to maximize his net profit over a new interval of time. There is another reason why this period of time will usually be short. No producer will be willing to suffer losses over long periods of time (as this assumption might require) in order to obtain a maximum of profit over a period of time greater than his life span.

In particular it may happen that the cost of production of any one producer is less than that of another and that as a result the market price of the commodity produced is lowered to the point where the latter producer can no longer operate with a profit. The inevitable result will be failure of this producer and possibly bankruptcy, followed by the appointment of a receiver to reorganize the business to reduce costs, or to dispose of the properties. This important case is not excluded from the new theory, and, as a matter of fact, it is possible theoretically to predict such failures and guard against them.

The second basic assumption is that the rate of production of any one producer can have no influence on the rates of production of other producers except insomuch as his rate of production will cause a change in price which will influence the rate of production of any other producer through the demand relation. This is simply another way of saying that free or atomistic competition is assumed. In particular, this assumption allows any producer, who desires and is financially able, to increase his production to the point where it is actually equal to or greater than the total demand. Such a practice will of course result in an over-supplied market with the attendant reduced prices, and may force him, or some, or all of his competitors into bankruptcy. In any actual situation this would amount to forcing out the small producer by mass production. If unit costs are reduced as they usually are in the case of mass production, the market price of the commodity becomes so low that all producers except a very few must discontinue their production.

The introduction of the two preceding assumptions or concepts has been made possible by assuming that the cost of production depends upon the rate of production and acceleration of production as well as upon the price of the commodity produced, the prices of labor and commodities required to produce the commodity, the prices of competing articles and the time. The essential departure from the theory of Moore is that the time has been introduced explicitly and the cost of production has been assumed to depend upon the rate of production and the acceleration of production among other things.

When the above hypotheses are translated into mathematical language, perfectly definite mathematical problems result. The depreciation, replacement and other forecasting problems of monopoly, co-operation and competition become problems in a branch of higher mathematics known as the calculus of variations. Some of these problems, such as the monopoly depreciation problem when interest is neglected, could be solved by then existing mathematical analysis, but other problems, such as the various problems of replacement, required further development of the mathematics of the calculus of variations. In all cases mentioned definite solutions can and have been obtained for very general cost and demand relations.

Short Time Forecasting

So far the reader may have the impression that forecasting business phenomena will now be a relatively simple matter. Such is far from being the case. In spite of the beautiful theoretical results which this new theory yields, it does not tell us how to do business forecasting. It simply tells us not to try it for long periods of time. There are many difficulties which will confront the trained quantitative investigator who attempts to apply the new theory. Some of these are inherent in the problems themselves, but others are due to our unscientific business practices. Before we can scientifically forecast business phenomena, we must measure the psychological effects of money-tightness, over-production, speculation, change in interest rates, advertising and so on. Before we can measure these quantities, we must request the psychologists to furnish us with a means of measuring them or ridding our business system of them. Until the cataloguing and elimination or measurement of all psychological influences has been accomplished, it will not be possible accurately to forecast business phenomena. The new theory, however, exposes fundamental fallacies in existing methods of forecasting and shows that they may be expected to be accurate only for short periods of time. It predicts that all existing methods of forecasting will fail at critical points unless they enlist the aid of divine providence and thus predict results which are not in accord with their expected results. It will be in-

teresting to see how these predictions of failure are made.

The new theory shows that the particular price and production curves which yield a maximum of profit to a producer of a given commodity, may be any one of fifteen or more distinct families of curves. One of these curves is truly periodic and would support the theory of Professors Jevons, Moore and W. C. Mitchell that prices periodically returned to a given price. Another curve accurately describes the present state of affairs which I have already indicated. A third curve shows fluctuations of prices at the beginning of an interval of time and a dying out of these fluctuations as time passes, the price and rate of production approaching constant values. A fourth curve indicates that prices remain nearly constant for a while, but as time passes these slight fluctuations about a constant price increase in intensity until a severe strain on the credit or money system causes a change in interest rate or cost of production and shifts prices and production to new curves. All of the remaining theoretical curves are just as typical of actual economic situations. For a given demand, supply, cost of production and interest rate there will be a unique price and production curve which will give a maximum profit, but a slight change in any of these quantities, say in the interest rate, may change the price and production curves to any other curves of the set of fifteen or more possible curves. For example, a slight change in interest rate will suffice to change prices from a curve which steadily increases to a curve which fluctuates with increasing intensity, or a curve which approaches a constant value. There is obviously no way of telling when supply, cost of production, interest rate etc. will change since these quantities depend upon psychological influences of which we know very little. To crystallize the idea involved it need only be said that the imposing or lifting of a tariff will be sufficient to change the costs of production so that prices and rates of production will follow different curves.

Variation in Price Curves

In any actual problem the demand, cost of production, interest rate, supply and other related quantities will not remain constant over long intervals of time so that it will not be correct for a producer to assume that his production for next year should be about the same as it was for last year. The hypothesis that a producer desires a maximum profit over a given period of time, which is usually the period of time for which a producer is unconscious of any changes in those quantities just mentioned, requires that a particular price curve be used only for that period of time. If we choose a period of time only slightly greater than the period for which these quantities are constant, we can not be sure that the price will follow the same curve, since any of fifteen curves are possible. In other words, it is fundamentally wrong to assume that because the price curve has obeyed one law for five, ten, or even a hundred years, it will continue to do so for so much as a month longer.

What has been said about price curves can be said almost in whole about production, demand and supply curves. Thus, if the price fluctuates periodically, the rate of production will also fluctuate periodically, but usually out of phase with the price fluctuations, that is, prices will rise for a short time before the rate of production rises. The number of different kinds of production, supply and demand curves is exactly the same as the number of kinds of possible price curves, and a shift from one of these kinds of curves to another will be caused by the same factors which will cause a shift from one price curve to another. It is, therefore, utter folly to attempt to extrapolate any of our economic curves expressed as functions of the time alone, unless we have reason to believe that interest rates, over-production and the various other factors, which can cause a change in the kind of price curve, will remain constant or approximately constant for the period of time for which our extrapolation is to be made.

Interdependence of Prices

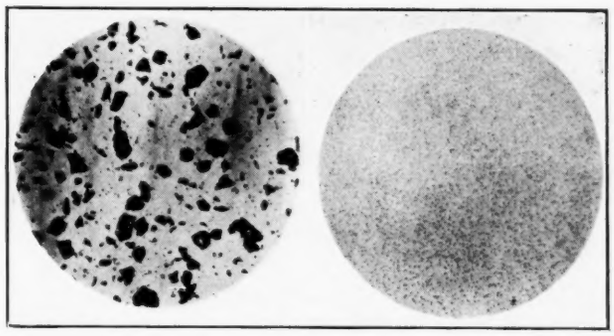
All of the preceding discussion has been confined to a consideration of single producers or groups of producers of identical commodities. It has been shown that there are at least fifteen different kinds of price and production curves possible for societies in which only a single commodity is produced. In our economic society which produces many commodities and services, the average of prices or rates of production will obey laws which are composites of those already mentioned. Anyone familiar with the principles of the mathematical theory of probability will quickly realize that the number of possible average price curves is very large indeed. We may, however, expect certain kinds of average price curves to predominate. If basic industries have price curves which obey similar laws, we may be led to believe that average prices obey these same laws. Changes in general price curves (average price curves) will, therefore, be determined by the changes in the price curves of basic industries.

How long will prosperity last ? That is a difficult question to answer. It is generally agreed that a country is prosperous when prices are rising and this is borne out by the theoretical result that the rate of production of commodities will increase as the price increases. Since prosperity results only when all industries are producing wealth (as opposed to money or real estate), the whole question of how long will prosperity last, must center about the behaviour of prices. Until we can predict when prices will change from one curve to another, we cannot hope to predict when prosperity will change to adversity. Since we do not know the psychological laws which cause changes in interest rates, speculation, money tightness, etc., we can not hope that our business predictions will be accurate all of the time.

A New
BY-PRODUCT SULFUR
For Agriculture

By Vincent Sauchelli
Koppers Company Research Laboratories

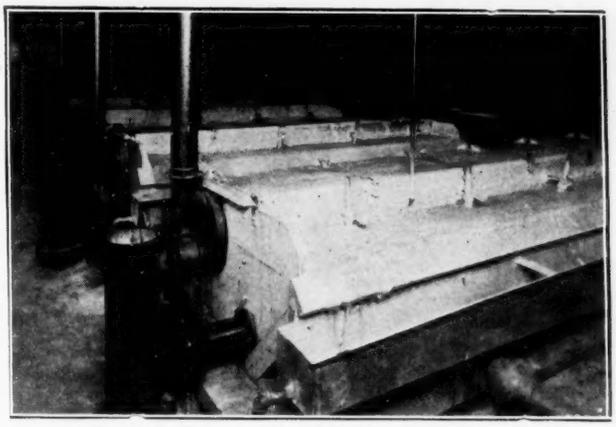
SULFUR, for the agricultural market, must be of finely divided particle size. For years manufacturers of spray and dusting materials have striven to produce, economically, a sulfur whose particle dimensions would satisfy this demand. Plant pathologists have demonstrated by careful field tests that the efficacy of sulfur is determined by its fineness—the finer the particles, the quicker the oxidation and hence the toxicity toward fungous diseases. For sulfur, is primarily a fungicide; a destroyer of those numerable plant diseases found everywhere in nature; mildews, scabs and "rots." How this demand of the agricultural market for finely divided sulfur ties up with some of the problems of the manufactured gas industry is an interesting illustration of the interdependence of all industries.



The difference in size of the particles of commercially precipitated sulfur and Koppers recovered sulfur is clearly indicated here. The by-product sulfur is shown at the right. Both are magnified one hundred times.

Manufactured gas contains hydrogen sulfide gas as an impurity. This hydrogen sulfide must be removed if the gas is to be used for domestic purposes. The problem of purifying gas has engaged the energy and time of the gas industry these many years. Numerous processes have been developed. These have been of two types;—the so-called "iron-oxide" process which is of the "dry" type; and the improved and modern "liquid" purification systems introduced by The Koppers Company Research Laboratories. These systems are of two general classifications, namely, the "Seaboard Process" and the "Sulfur Recovery Processes." As the name suggests, the sulfur recovery processes purify manufactured gas and recover the sulfur which is present in the gas in the form of hydrogen sulfide.

The gas industry's problem was to furnish a purified gas to the American home. When, however, it was finally solved by means of the several liquid processes, it was realized that a definite contribution to another industry had unintentionally been made. One of the products resulting from the purification of gas was elemental sulfur recovered in an extremely fine division. Here was a product so desired by the plant pathologist—sulfur with particles of colloidal dimensions, wettable, easily suspended in water or in miscible oils, and obtained in this ideally physical condition without the necessity of mechanical grinding. Before this sulfur was placed on the market, its value had to be proved by careful field tests, carried out by trained plant pathologists. Tests had to be made under various climatic conditions, on all sorts of crops, and in all types of concentrations and mixtures.



Thylox Liquid Purification Process, showing outlet side of machines in operation discharging sulfur.

An idea of the fineness of this recovered sulfur is obtained from some comparative measurements which involve commercial competitive sulfurs. Recovered sulfur has particles ranging from less

than one micron (0.001 millimeter) to 15 microns. Ground roll sulfur dust particles range from 50 to 200 microns. The accompanying table, prepared by E. R. de Ong and confirmed by our own laboratories, gives a fair picture of these sizes. For those who can visualize inches easier than millimeters, we will translate these dimensions by stating that recovered sulfur particles are all less than 3/5000 inch in diameter. The possibility of utilizing this type of sulfur in the preparation of agricultural spray and dusting materials is now apparent. How is the sulfur recovered in this condition is a fair question at this point.

PARTICLE SIZE IN COMMERCIAL AND RECOVERED SULFURS

Number in Each Group of Sizes for 20 Particles

Size Microns (0.001*mm*)	*Flowers of Sulfur*	*Ground Roll Sulfur*	*Ground Flowers of Sulfur*	*Mercks Precipitated Sulfur*	*Koppers Recovered Sulfur*
1-15	0	2	2	5	20
25-50	2	7	7	10	0
50-100	5	6	11	5	0
100-200	11	4	0	0	0
200	2	1	0	0	0

The essentials of the process are easily told. Raw gas as it comes from the carbonization process contains hydrogen sulfide and other impurities. The gas is passed through a specially prepared chemical solution. This solution absorbs the hydrogen sulfide and is led into tanks. These tanks are equipped with submerged pipes which have many orifices through which air is forced. This aeration causes a chemical reaction which liberates elemental sulfur. The air used to aerate the solution performs another service. I mentioned how it is forced into the solution in the form of minute bubbles through the tiny orifices. These air bubbles seem to have a particular attachment for the sulfur particles liberated in the solution. As a bubble attaches itself to a sulfur particle it lifts it to the surface. The result is a neat separation and flotation of the sulfur in the form of a froth or foam. The metallurgical industry makes use of this same principle in the recovery of minerals.

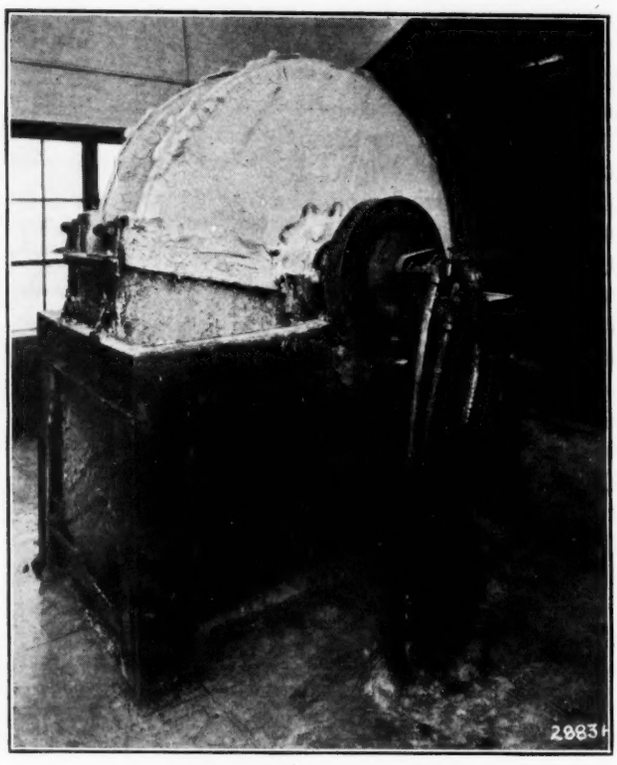
Removal of Impurities

The sulfur froth may become 6 to 18 inches deep and contain from 6 to 12 per cent. sulfur. A sufficient air pressure is maintained in the system just to force the froth to overflow into troughs. In the trough the froth subsides through the formation and release of the larger air bubbles leaving a creamy slurry which flows into a pit or tank. The slurry is then pumped into filter presses where the sulfur is recovered as a wet cake having about 50 per cent. water.

Other impurities of the gas are removed in this process and are present in the sulfur cake. They are all water soluble, however, and when necessary, can easily be washed out leaving a pure sulfur cake.

That briefly is the recovery process. Having now the material in the raw state, there remained the task of developing a profitable market for it. The Koppers Company arranged to prove the agricultural value of this product by thoroughly testing it in a series of extensive field and laboratory experiments. First an agricultural expert was employed, who would be able to supervise and direct the experimental work. Next a fellowship was established through the Crop Protection Institute, an independently scientific body sponsored by the National Research Council. Research was begun at each of two leading State agricultural experiment stations. Co-operating with the research fellows were plant pathologists in thirteen other State experiment stations and four Canadian field stations, as well as experts in private and Federal laboratories. The results from these tests would be as unbiased and as thorough as possible.

Climatic conditions were as varied as those of Nova Scotia, Florida, British Columbia, Illinois, California and Colorado. Fungous diseases were studied on all fruit, vegetables and flower crops. Excellent results have been reported from all quarters. Unusual



Another step in the Thylox process showing the continuous filter press in operation.

superiority of the sulfur cake is indicated for some crops. Superiority of the sulfur dust is reported for other crops. A general statement can be made that expectations have been satisfactorily realized. The experimental work is still being continued to confirm previous results and to find new uses and new combinations.

Complaint against Pennsylvania Salt Manufacturing Co., charging it with acquiring stock of a competitor, the Michigan Electrochemical Co., in violation of Clayton Act, is dismissed by Federal Trade Commission.

A Wise Selection of

Chemical Specialty Markets

By J. W. Wizeman
Chemical Division, U. S. Department of Commerce

THERE are few classes of chemical commodities that have a wider scope of sales possibilities—actual or potential—than those materials designated as sanitation specialties, including household disinfectants, insecticides, deodorants, germicides, fungicides, exterminators and fumigants. Numerous factors are responsible for this condition. Throughout the world there are vast regions where modern sanitary methods are not in use; adequate sewage and garbage disposal systems are unknown; and the use of products to promote or preserve health is not practised on a scale commensurate with the needs of the inhabitants. The economic losses caused by the spread of disease germs carried by insects and rodents, and as a result of preventable infection is appalling. Aside from the hygenic factor, many of the excellent preparations on the market permit cleaner surroundings with less drudgery, to say nothing of the added comfort in dwellings and places of business that have been freed of pests. While manufacturers of disinfectants, insecticidesand other chemical sanitary specialties are in business for profits, they have, nevertheless, a very important task to perform to mankind in making available, in convenient form, the materials so essential to a higher scale of living for the human race.

With the continued growth in the consumption of insecticide and disinfectant materials, manufacturers in this field find themselves confronted with new sales problems almost daily. Mr. Wizeman offers a few timely suggestions on that important question of the selection of a market.

The growth of large centers of population and the elevation, through education, of the hygenic standards in those sections of the world that lack at present modern conveniences are factors that point to a constantly expanding market for sanitation specialties.

American manufacturers possess many advantages essential for supplying the markets of the world with these products. We have in this country abundant supplies of raw materials and the largest consuming market, which has enabled our producers to attain volume production of attractively packaged specialties, high in quality and reasonable in cost of manufacture.

Unfortunately, however, our mass production has created complicated problems that have yet to be solved, of which the primary one concerns the distribution of the finished merchandise at a reasonable price to the consumer with a fair margin of profit to the manufacturer and the distributor. Many attempts have been, and are being made to find the ideal remedy.

Retailers and wholesalers recognize the gravity of the situation and in their endeavor to better their own position have developed new complications for the manufacturer. We have seen in a short period of years many of the so-called "general stores" give way to the specialized retailer and now we have a return of the general stores carrying a multiplicity of articles, operated, not individually, but by organizations controlling hundreds, and in some cases thousands of links in their chains. Transitions of this nature and other reasons have permitted manufacturers in their search for new outlets to drift into unexplored channels without a thorough appreciation of the difficulties that might be encountered. Sales campaigns, even though backed by generous advertising appropriations, have frequently failed to yield the volume of business anticipated, or the cost of distribution has absorbed the profits that the promoters hoped to realize. Too often poor markets have been oversold and good ones undersold. It becomes more evident each day that results in the form of satisfactory profits require fundamental information in advance as to where the output of the factories can be successfully merchandized.

The Department of Commerce can assist manufacturers in many ways to overcome the obstacles that lead to waste of time and money in distribution. This is accomplished by supplying authoritative information of a type that enables a sales manager to build a selling campaign on a sound foundation. For example a study on a nation-wide scale of marketing

and distribution methods was inaugurated during the past month. The survey is expected to present a cross section of distribution conditions for the whole country and will pay particular attention to those conditions that make for waste in distribution.

Another major undertaking of the Domestic Commerce phase of our work is concerned with a series of regional market surveys aiming at an interpretation of the commercial structure of the United States. For the purpose of these surveys the country has been divided into nine regions, based on differences in economic and business conditions. The "Commercial Survey of the Southeast" has been completed. Similar surveys in New England, the Pacific Southwest and the Mid-west are now in progress.

Regional Market Surveys

The "Atlas of Wholesale Grocery Territories" which shows 183 major trading centers in the United States, together with the logical trading area surrounding each center has proved to be of inestimable value to many manufacturers of chemical specialties.

In the search for profitable markets to exploit there is a large outlet abroad, overlooked entirely by many manufacturers and intensively cultivated by others. The advantages of having a market in foreign countries for a reasonable share of your plant's output are many. Production is thereby increased which frequently lowers the unit cost of manufacture, and strengthens the firm's position in the markets at home and abroad. This is particularly advantages to insecticide makers on account of the seasonal nature of their product. Markets south of the equator have seasons opposite from this country. Furthermore manufacturers successful in obtaining orders from foreign markets in the hemisphere can usually fill them before actively entering the domestic shipping season.

The Department of Commerce can assist in many ways to help American manufacturers develop export trade and if advantage is taken of the services which are freely available it may be found that foreign business can be had with a lower selling cost and consequently a larger profit than could be realized on an equal amount of domestic business.

That some manufacturers of household insecticides and disinfectants have given serious attention to export trade is evidenced by the statistics for 1927, which place the extent of our foreign trade at $3,650,000 at wholesale prices—almost double the accomplishment of the previous year. Notwithstanding the rapid development, there need be no fear of reaching a saturation point in the near future, for it is observed that three foreign countries alone accounted for one-third of the shipments. Nor should American manufacturers overlook those countries that have highly developed chemical industries—our best market in 1927 was Germany where sales of American insecticides and disinfectants exceeded a half million dollars at wholesale prices. In fact the European continent absorbed one-third of our total exports. Shipments to France amounted to $343,000—an increase of 426 per cent. in a single year.

Notwithstanding the existence of preference tariffs one-fifth of the foreign shipments of household insecticides and disinfectants were destined to markets of the British Empire. Sales in Latin America exceeded a million dollars of which Argentina alone accounted for 40 per cent. while Cuba, with one-third the population of Argentina, bought almost half as much.

A detailed analysis of the world's trade reveals numerous sections where sales have been limited and to assist American firms in the development of those markets the Chemical Division recently inaugurated a series of brief reports on all important foreign countries, entitled "World Trade in Insecticides." These circulars are based upon data submitted by many of the 800 foreign service officers of the Department sof State and Commerce. They are intended to supply in a comprehensive manner a knowledge of the respective markets and it is hoped that they will serve as a foundation for those contemplating the sale of their products in new foreign markets or the expansion of their present export outlets. Plans are in progress to make a survey of the world's markets for polishes, including preparations for metal, furniture and auto body surfaces.

While these reports are being prepared specifically for chemical products manufacturers there are many other ways in which the Bureau can serve the exporter. Some of the outstanding features of the foreign trade promotional services are:

"Carefully detailed reports of the business history of over 350,000 importers and agents abroad. These individual reports are constantly being revised as new information becomes available and are of considerable value in aiding firms to select foreign distributors.

"General trade lists of prospective merchants and distributors of your class of products arranged by country or specially prepared lists of firms whose qualifications indicate that they might serve as satisfactory agents.

"Specific requests for your goods in the form of foreign trade inquiries. Many firms have attested to the value of this service, in fact some have reported that a large share of their foreign trade was established through the medium of these prospective sales opportunities.

"Information concerning advertising media and other data that might prove helpful in planning advertising campaigns in foreign countries.

"Information concerning foreign tariffs, trade regulations, methods of shipping samples and advertising matter abroad, documentation.

"Method of packing for export.

"Data on foreign commercial laws insofar as they may affect your export trade, information on patents and trade marks, and assistance in adjudicating claims.

Industrial Reorganization

Since the War

By Dr. K. G. Fenelon
Edinburgh University

Prepared primarily as an economic study of industrial conditions in Great Britain since the war, the tendencies and problems discussed here are so startlingly similar to those facing industry in this country that the mere change of some names would make it seem like a discussion of modern industrial America. Shifting markets, changing industrial centers, new sources of fuel and power, new industries, and research in industry are all factors in the newer economic tendencies whose trend is pointed out by Dr. Fenelon.

NATIONAL well-being requires a diversified economy, as otherwise any depression in the one industry or group of industries might be calamitous. It is, of course, possible and indeed it may be desirable for a nation to specialize on the production of certain commodities, but during the war, expansion was not undertaken to meet the requirements of export trading and in any case, since the war, foreign markets have not been available to carry off surplus production at prices which would have proved remunerative to the producers.

Since the war, certain industries especially coal, iron, and steel, shipping, railways, cotton and wool textiles have suffered from serious and prolonged depression for which a variety of causes have been responsible. In the first place, coal, which was so important a factor in pre-war industrial economy is no longer supreme, owing to the coming of oil fuel and the development of hydro-electric power abroad. Coal exports have suffered and bunker coal shipments have been reduced as a result of the increasing utilization of motor ships or oil fired steamers. Even in Great Britain, motor transport using oil fuels has tended to take traffic from the oal-using-railways. The only consolation which can be derived from the depression in the coal industry—and it is cold comfort for our generation—is that some conservation of our coal supplies may result. If coal exportation had been carried on at the pre-war rates the probable exhaustion of our supplies—or at any rate a marked tendency towards rising costs—would have had to be faced in the not too distant future. Jevons writing in 1865 had stressed the necessity of economizing in the use of coal as it is a non-replaceable natural asset and though marginal increasing costs have been pushed into the future by new coal mining machinery, new discoveries of coal, new technique etc., they will have to be faced in the future. At some time the re-orientation of our industrial structure and of our foreign trade will have to be effected. If the crisis in the coal mining industry leads to the more economic treatment of coal in our own country, it will be so far to the national good. In so far also as a new industrial revolution based not as formerly on the coal industry is carried out, the way will be prepared for future industrial changes.

In the other pre-war export industries, nineteenth century conditions have passed and the British monopoly of manufacture has ceased to exist. British manufacturers are now faced with entirely new conditions. There are great difficulties in obtaining foreign markets as other countries have developed their own industries and are no longer content to buy British manufactures. The war left behind a legacy of intensified national feelings. Nations—not only in Europe but also in the East—are now attempting to build up more or less self-sufficing economies because rightly or wrongly they desire to be manufacturing countries.

Contrasted with the severe and prolonged depression in the coal mining, iron and steel, shipbuilding, cotton and wool trades, engineering and the railways is the prosperity of certain newer industries, many of which are the result of modern invention and the commercial application of scientific knowledge. Among these relatively prosperous industries are artificial silk—which has almost doubled the number of its employees since 1923; artificial stone and concrete manufacture—which has increased the number of its workers by about 65 per cent. in the same period owing to the increasing use of concrete in place of wood or other materials; paint manufacture; scientific and photographic instrument manufacture; musical instrument and gramophone manufacture; electrical

engineering, contracting, wiring, cable and lamp manufacturing; brick and tile manufacture; stone and slate quarrying; distributive trading; the cycle, motor cycle and motor car industries; furniture making; laundry work and the motor transport industry. Other progressive industries include constructional engineering, printing, publishing and bookbinding, entertainment, and sport, iron and steel tube making, rubber manufacture, tool making and shipping services.

It should be noted that among the progressive industries are a number which are becoming important as export industries, though so far their exports have not compensated for lost exports in the heavy industries. The new industries are not concerned, however, exclusively with the home market as is sometimes supposed. In the cycle and motor cycle industries for instance, exports have been increasing from year to year and foreign manufacturers have been easily beaten in the race. In an allied industry, that of light aeroplane manufacture, though at present the number of exports is not large, British light aeroplanes have earned a great reputation in foreign markets. In the future it would seem that British exporting industries will have to concentrate on articles which can hold their own by reason of their quality and good workmanship. The tendency seems to be in favor of higher grade articles which, though of smaller bulk, are of greater value than our old exports. Incidentally, this development may have unfavorable reactions on our shipping, especially tramp steamers, and the problem of balancing cargoes will become still more difficult since imports of food, timber, etc. are bulky in proportion to their value. It is found that high grade articles or luxury qualities can climb even high tariff walls in foreign countries. An inspection of the shop windows of Fifth Avenue or Broadway reveals a surprising number of luxury articles imported from Europe. These changes in world economy mean that British manufacturers can no longer rely on their articles selling themselves as they did during the 19th century, and that our industries must concentrate on quality and our exporters develop the selling side of their organization. Customer's needs in foreign countries must be studied and catered for.

New Methods from Research

In another direction too, our industrialists must face changing conditions. Many of the expanding industries depend on scientific research and invention. Among these may be mentioned motors, aeroplanes, artificial silk, gramophones, artificial stone. It is therefore essential that the liaison between science and industry should be encouraged and that manufacturers should be ready to try out new methods and inventions. Much has no doubt been done since the war, but there is still room for closer co-operation between science and industry. In the older industries also there is great scope for technical development. Research and the adoption of new methods should yield good returns, for instance, in coal mining and coal utilization, iron and steel manufacture (e. g. new steels and alloys harder than the old rustless steel, etc.), the older textiles (e. g. combination of wool and cotton with artificial silk) and railways (e. g. new operating devices, improved equipment, etc.)

Though new exports are growing, the compensating development of the new industries has been felt most in the home market. The total volume of British exports is only about three-quarters of what it was before the war. There would seem to be an important change taking place in our national economic equilibrium. During the post-war years the internal market has been well maintained and commerce, banking, retail shopkeeping, amusements and entertainments, the distributive industries generally and the building and furnishing trades are flourishing. No doubt in the home market, purchasing power has been maintained to some extent by pensions, unemployment insurance payments and poor relief, while the increased number of women workers employed in industry and commerce has compensated for the loss of "man power" represented by the unemployed workers in the heavy industries. From the economic point of view this expansion in our labor force should help to increase the national income and national prosperity. It is surely fallacious to imagine —as some appear to do—that an augmentation of the labor force of the country under present conditions would lead to lower standards of life; a "work fund theory" should be as discredited as the "wage fund" theory.

The new economic equilibrium which is slowly being achieved presents also another aspect to the investigator. Besides the change in the fortunes of different industries there has been a change in the fortunes of different parts of the country. There has been a migration to the Southern countries of England from the North, Wales and Scotland. In some degree, no doubt, this corresponds to the change over to new industries and to commerce. The development is, however, more significant than a mere spreading of industry away from the coalfields as it is found that certain industries which have declined in the North have expanded in the South and industries which have expanded in the North have increased at an even greater rate in the South.

It is not easy to determine the causes of this transference of industrial activity to the South, though it would seem that a variety of influences are at work. In the first place, there would seem to be a reversal of the nineteenth century forces which led to concentration in the North. The heavy industries are depressed and the new industries do not find it necessary to locate themselves in the coal areas. In the second place, it would seem that there is growing up a more intense economic activity throughout the country. In part this no doubt has been due to the development of motor transport and to the growth of electric power distribution.

As regards the more specific causes, one is the relative exhaustion of the natural resources of the North. It is for this reason that the steel, coke and even coal mining industries are tending to shift southwards. In some cases the attraction of the London market has been important, e. g. publishing, printing and bookbinding. The London market takes a large proportion of the output of many industries. In the South there is a great freedom from hard and fast trade restrictions and trade customs of all kinds, and this is especially important for new industries or for old industries in which industrial technique is being revolutionized. Those who desire to obtain the full benefits from more economic organization are therefore inclined to try their fortunes in the South. Another cause favorable to the South is that local rates are lower on the average in the South than in the North.

Is a revival possible in the heavy industries? The possibility of a revival in the heavy industries must be borne in mind and it is yet too early to write them off as slowly decaying industries. It is certain that they must continue to play a large part in our national economy and provide employment for a large number of our workers. It is not at present possible, however, to determine the exact position they will occupy in the new economic equilibrium which is gradually being attained, though some revival is to be hoped for. Much would seem to depend on the possibility of reorganization and the discovery of the new methods and processes both in the industries themselves and in the utilization of their products. Recently there have been signs that at last the reorganization of the coal industry is being seriously attempted both on the technical and marketing sides. Research work is being carried out in many directions, e. g. low temperature carbonization, the use of pulverized coal fuels, the hydrogen treatment of coal to produce oil fuels, etc. The position of the coal mining industry would be greatly improved, if new methods of using coal became commercially possible and these would put it on a more equal footing with its new competitor, oil. There are also distinct signs that the gas-making industry will be reorganized on the basis of improved technical processes and larger scale distribution. In Germany it appears that long distance gas supply systems have proved very successful. The Royal Commission on the Coal Mining Industry stated that they believed that in the future the coal industry will be found to have become an integral part of a great industrial complex which will comprise also electricity, smokeless fuel, gas, oil, chemical products, blast furnaces and probably other products.

In the other heavy industries, research work is also being carried out, and it is possible that new improvements may revolutionize these industries. In the steel trade, for instance, there are great possibilities for the commercial production of new steels. In the chemical industry, important developments are taking place, but as to these the industry is for the most part silent in accordance with its traditions.

Reorganization, however, is likely to result in the further displacement of workers since the tendency of the new technical methods of mining and manufacture in the heavy industries is to employ less labor for a given output. Thus the contention of the industrial Transference Board that workers in these industries will have to move to other trades would seem to be fully justified. So far the main difficulty has been the lack of mobility of labor. During the present year, however, transfer is being effected at a more rapid rate, and the government has provided training facilities at various centres, while help is also being offered towards the cost of removals. A practical difficulty is to avoid repercussions on the employment possibilities of the more fortunate areas and for this reason the policy of transfer has to be proceeded with, somewhat cautiously.

The New Rationalization

In conclusion, something must be said about "rationalization" as it has come to occupy a prominent place in present day discussions. Though by no means easy to define, as different persons have given different interpretations to the term, "rationalization" refers to the better organization of industry and of industrial administration, whereby waste would be eliminated, surplus production restricted, prices stabilized, scientific technique adopted, and production regulated, in accordance with the probable consumption. It is hoped to eliminate or restrict the ups and downs of prosperity in particular trades which it is said result from over-severe competition, though at the same time, it is asserted that exploitation of the consumer will be avoided. In other words, a *via media* is being sought between competition and monopoly. A number of writers, notably Walter Meakin in his "The New Industrial Revolution" and Sir Alfred Mond (Lord Melchett) in his "Industry and Politics" strongly advocates rationalization as a cure for our industrial ills. In so far as rationalization means the avoidance of the wastes of competition, the introduction of new methods and of new processes, a closer relation between scientific research and industry or the adoption of more economic methods of production, it could not fail to have beneficial results, and it is to be hoped that any such possible improvements will be adopted. Rationalization policies might, however, have injurious reactions on the consumer and the general public, if they meant that prices were raised and output restricted. It might not be easy to guard against inefficiency in later years after the stimulus of the original movement had worn off, and if a combine capitalized the overhead charges of inefficient concerns which were amalgamated on the adoption of rationalization, the community might suffer, and such policies would react unfavorably on our whole economic organization.

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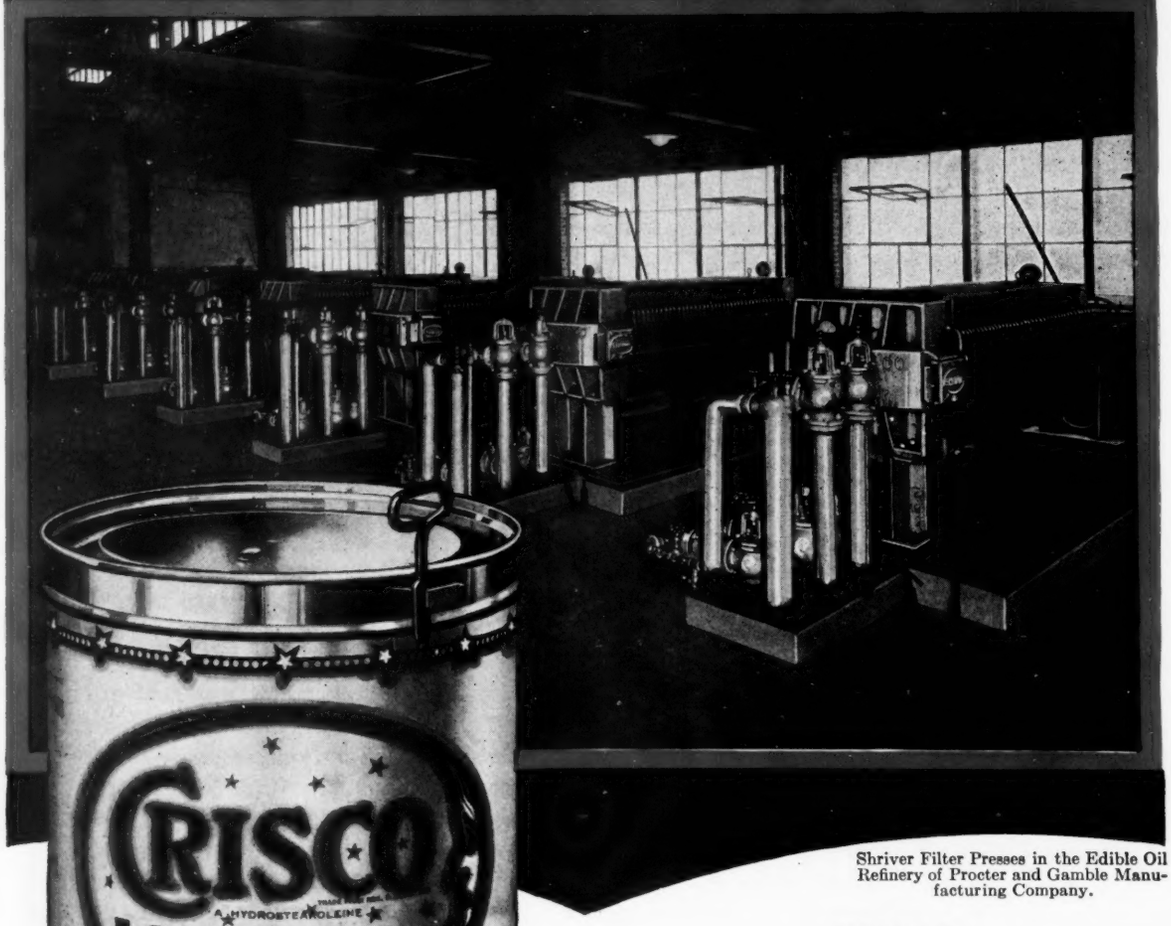

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Cost Accounting Practice in an American Chemical Plant

By J. J. Berliner, B. C. S.

COST accounting records of this chemical company are obtained by co-operation of the works office and the general office. The works office reports the facts of operation in quantities, and the general office places a value on the quantities reported and records these values and the summary of labor charges in the accounting books.

All materials received must be reported to the general office by the receiving department. The receiving clerk is always supplied with a copy of the purchase order showing the quantity and quality of materials ordered, and the cost, when that is known. A subsidiary separate account is kept for each raw material in a subsidiary ledger controlled by a raw materials' account in the general ledger. The subsidiary ledger is ruled in six double columns to provide a complete record of purchases and consumption for a period of six months. The invoice cost of the material, inward freight, containers, duties, insurance, handling charges, and any other items of expense which are directly chargeable to the cost of raw materials are entered in the debit column of the raw materials' account. If the material is one which loses value through evaporation or dissolution the actual loss which occurs between the time when the product is received and when it is used is charged to the cost of the material. If incoming containers are salvaged or returned to the vendor, the amount received is credited to the material to which they were originally charged.

Since costs are collected monthly, materials are charged to manufacturing at the end of each month on an average cost basis. This average rate is determined after the works office has made its monthly report to the general offices of the quantity of materials consumed and the losses known to have been sustained from evaporation or other causes. This report is often based on estimates, since it is impossible to secure accurate figures when materials are handled in large quantities or stored in large piles in the open. Materials handled in small quantities are easily and accurately accounted for.

Since materials are weighed as used, the foreman of each department reports daily to the works office the quantity consumed. These reports are summarized weekly and the summary is sent to the purchasing department to keep the purchasing agent informed on the trend of consumption. The monthly reports are also made, showing the opening inventory, purchases, consumption, sales, adjustments, losses, and closing inventories. The opening inventories, purchases, and sales are always reconciled each month with the general books and the raw material ledger.

In several of the processes one or more by-products are given off for which the main products are credited. A stamped rate has been established for each by-product. At first an effort was made to relate the standard rate to the selling price of the by-product, but when the prices of all chemicals advanced during the war, the standard rate was not changed. As a result a large profit was shown for the by-products, but only a small profit was shown for the main products.

The company defends this method, because it makes the cost of the main products comparable from month to month, and it enables the company to determine whether or not the main product is paying for itself. The value of the by-products, calculated at the standard rate, is deducted from the cost of the raw material which enters into the process. It is argued that all the labor, power, supplies, repairs, and factory overhead are chargeable to the main product, and that any credit to the main process on account of the by-product is directly due to the nature of the materials used. Hence the standard rate is not influenced by the point at which the by-product emerges.

The expenditures of this company in the manufacture of its products are as follows: labor 10 per cent., material 39 per cent., power 12 per cent., supplies 2 per cent., repairs 8 per cent., and overhead 29 per cent. The company considers power, supplies, repairs, and fuel used directly in the processes, in the same class with productive labor. This class of expenditure is called "Conversion Cost" on the cost card. Because of the departmentalization of the plant by products, these expenses are chargeable directly to the products.

Leaders of Thought Assemble Here Soon

An Invitation to Join Them

Grand Central Palace, New York, the home of International Industrial Expositions will soon open its doors to the Twelfth Exposition of Chemical Industries.

More than three hundred manufacturers whose engineers specialize in providing means for improving process industries will proudly present their newest and best for your inspection.

Their chemical engineers and other processing specialists will be on hand to discuss your problems with you.

The exhibits include materials, equipment, machinery, instruments and supplies—everything needed to make old products better, to make better new products, to reduce production costs, to increase output, to convert waste into value.

Sixty-seven thousand chemists, engineers and business men took advantage of the opportunity to attend the last exposition. Indications point to even larger attendance this year.

If you attended before, urging will not be necessary for you to come again. Your business success requires you to visit the exposition.

Write down the dates. May 6th to 11th, 1929.

Management International Exposition Company, largest Industrial exposition organization in the world.

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When the plant is operated at capacity, 450 men are employed, but during slack seasons the payroll has been as small as 325 men. This number does not include foremen, chemists, works office employees, and others who receive a salary. The manufacturing operations require little labor because many processes are run continuously with mechanical equipment. The handling of material and finished products requires the largest proportion of direct labor, and approximately 95 per cent. of the labor of the service departments is charged to maintenance or plant construction.

Each man employed on an hourly wage is given a "Hiring Slip" by the employment manager, which gives authority to the timekeeper, who is also the paymaster, to assign him a time-clock number. Every laborer is required to punch the time clock whenever he enters or leaves the plant. Both the direct- and indirect-labor costs are determined from the time-clock record.

A carbon copy of the payroll, excluding the columns for days of the week, is sent to the general office. This copy is both the notification to the cashier of the amount of money to be paid and the record used by the general office to audit the payroll.

Dividing Labor Records

In order to have a check on the efficiency of labor within each department, the labor records for each process are divided into operations. The foreman of each department sends to the accounting department of the works office a daily record of the work of the men in his department, explaining what they did, the length of time they were on the operation, and their rate of pay. The foreman's time is not included, because his work is entirely supervisory. A check on the accuracy of the reports for time and amount is obtained by cross-totaling. The total time is also checked for accuracy with the time-clock records. The daily reports are summarized by operations and the weekly or monthly cost of any operation in any department may be obtained by adding the columns in which that operation is summarized. In order to get a complete cost by operations, the salary of the foreman is prorated on a percentage of labor cost.

A statistical analysis of the weekly payroll is made showing the cost of labor in relation to production in net tons, in each of the manufacturing departments; each of the service departments; maintenance; plant construction; handling of raw material; handling of finished goods; manufacture and maintenance of carboys; cooperage; filling containers; handling freight; cleating of cars and marking shipments.

Power is an important item of expense, constituting 12 per cent. of the total cost of all the products of this chemical company. The first cost of power is the generation of steam, which includes the cost of labor, fuel, supplies, and taxes, insurance, repairs, and depreciation on investment. The steam generated is charged out of the steam-generating department to the compressed air, electricity-generating, and steam-distribution departments at a unit cost per 1,000 pounds of steam delivered.

The steam furnished to the distributing department is used in the manufacturing processes and for heating. Because the cost of maintaining the piping system increases the cost of this steam, a new rate per 1,000 pounds is calculated as a basis for charging the manufacturing departments. Bailey steam meters are used to measure the amount of steam consumed by the important manufacturing departments, but the amount of steam charged to the other departments is estimated from the production. Tests are made from time to time by metering the steam into a department for several days to determine the amount of steam required to produce a ton of product. Since meters are attached at the departments instead of at the point where the steam leaves the boilers, any waste of steam which occurs from radiation during distribution is neglected. The amount of steam lost, however, is small because the pipes are well protected with asbestos covering.

The steam consumed by the electric generating department is about one-third of the cost of generating electricity. Other costs in this department are labor, oil, supplies, and the fixed charges on the equipment and building. Electricity is charged to the consuming centers at an average cost per kilowatt-hour. As in the distribution of steam, the electricity is metered to the most important consuming departments. The quantity of electricity furnished the other departments is estimated from the number of kilowatts required to produce one ton of product. The horse-power requirements of the motors are also used as a guide in making these estimates.

The Storehouse Inventory

About 4,000 different articles are handled in the supplies storehouse. A perpetual inventory with a balance-of-stores card for each article is maintained. At the end of month the storekeeper makes a report of requisitions filled from the original requisition slips which have been filed by departments. The duplicates are filed by articles and used as the authority for posting to the balance-of-stores cards.

In order to save handling expenses, supplies are delivered whenever possible directly to the manufacturing departments using them. Storehouse expense comprises inward freight and handling charges on supplies, salaries of storekeepers, and fixed charges of the storeroom. This expense which is usually about 10 per cent. of the value of supplies used during the year, is absorbed by adding 10 per cent. to the value of supplies used for plant construction and maintenance and prorating the remainder to the value of supplies used by the manufacturing and service departments.

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The chemical action of the products on the apparatus and buildings makes frequent repairs necessary. Because the expenditure for repairs varies in a marked degree from month to month, a standard charge for repairs is made each month and an account "reserve for repairs" is credited. In order to make costs more uniform, actual expenditures for maintenance are charged to a repairs account. At the end of each year the reserves are adjusted to the annual expenditures, because it is deemed wise not to carry forward on the balance sheet a deferred debit or deferred credit on account of repairs.

Burden

Overhead expenses, which are 29 per cent. of the manufacturing costs, are classified into taxes, insurance, depreciation, works administration, laboratory and general expenses. The company owns its real estate and buildings, but neither rent nor interest on invested capital are charged as a cost because they are considered only an anticipation of profits.

The amount of taxes on both real estate and equipment, which is always known at the beginning of the fiscal periods, is distributed to departments according to the value of the equipment in them, the value of the buildings having nothing to do with the distribution. Each apparatus is valued at cost, and the valuation is not changed unless there is a replacement at a higher or lower price than the original cost.

Insurance charges include protection against fire, explosions, and workmen's disability compensation. Premiums on explosion insurance are charged directly to the department in which the explosion may occur, regardless of the fact that an explosion may damage adjoining departments. Since premiums on workmen's compensation insurance, which amount to almost $35 a year per capita, are based on the payrolls, they are charged to departments on the basis of labor costs within the departments. Fire insurance, which is carried at a blanket rate, is distributed to departments according to the value of the equipment.

Depreciation is charged on a straight line method. Buildings are depreciated at the rate of five per cent. per year on cost, and equipment at the rate of 7½ per cent. per year on cost. This low rate is made possible by the large expenditure for maintenance. Obsolescence is a very important factor in the chemical industry, but all charges of this nature are provided for in the charge for depreciation.

The works administration expense, which includes all cost incidental to the works office, is distributed to the manufacturing departments on the basis of manufacturing labor costs. Research expense is charged to surplus, and is not considered a cost of manufacturing. The cost of testing a product is charged to the department for which the test or experiment was made on the basis of the chemist's time. Overhead expenses of the laboratory are distributed on the basis of the chemist's time. General expense includes the overhead of the shops, indirect labor not chargeable to repairs and plant construction, trucking and teaming, and other miscellaneous expenses.

The company maintains several shops, but only a small percentage of the labor of these shops is not definitely chargeable to repairs or plant construction. When the payroll is prepared, it is classified by departments in order that the total amount of wages paid to employees in any department will be known. The amount of wages chargeable to maintenance and plant construction, however, is credited to the shop accounts, and the balance, if any, is added to the overhead of the shops, which is distributed to the manufacturing departments on the basis of direct-labor costs.

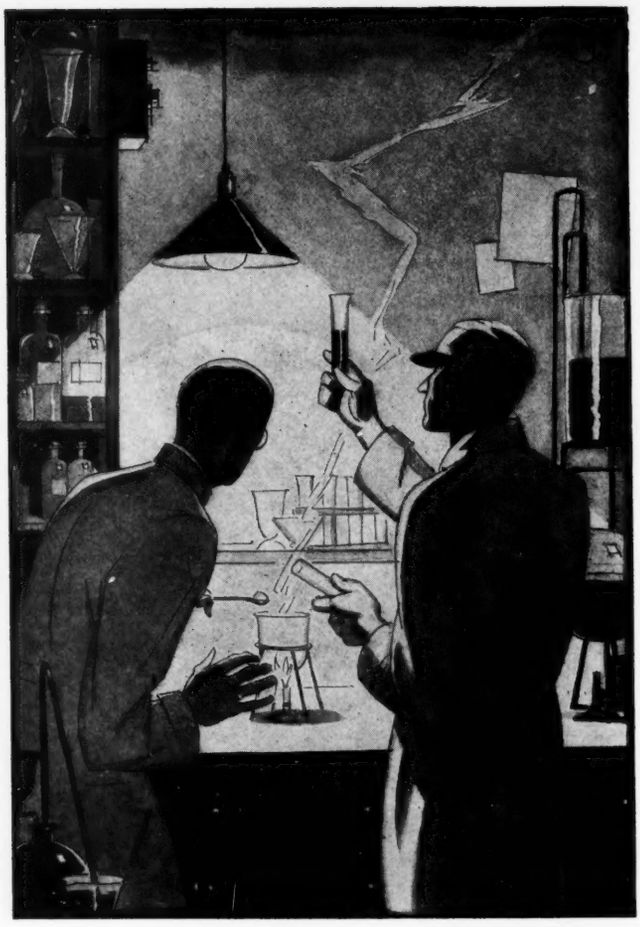
No charge arises for idleness of men, since they are paid an hourly wage for time worked only. Daily records, which are summarized at the end of each month, are kept of idleness of units and departments in the plant. A minimum of six days is set, below which no account for idle is taken, so that at the end of the month the usual amount of fixed charges is entered on the cost card. But if a department has been idle more than six days, the percentage of idleness is calculated on the basis of the normal number of working days in the month. This percentage is applied to the total amount of fixed charges, and the result is deducted from the manufacturing costs on the monthly cost sheet and charged to profit and loss regardless of the cause of the idleness.

Each month the works accounting department reports to the accounting department of the general offices the quantities of each product produced during the month. Whenever possible, this report is made from actual records of production, but in some continuous processes it is difficult directly to measure the quantitites manufactured. In cases the production is estimated by the inventory method. The quantity shipped, which is obtained from the shipping department, is added to the closing inventory; the opening inventory plus purchases, if any, are subtracted from this sum in order to secure the quantity produced. Adjustments are made, of course, for any known losses.

Determining Process Efficiency

Besides being the basis for determining the proportion of materials to use in a process, chemical equations are used to determine the efficiency of a process. The quantity of product obtained is divided by the quantity which should have been obtained according to the chemical equation, which gives the percentage of efficiency. The number of tons of product produced per man-hour is determined separately for each department. These results are plotted on graph paper in order to provide the works manager with a weekly comparative check on the efficiency of labor. Expense reports are made on columnar sheets to afford an easy comparison from month to month. A check on economy is maintained by requiring the expense statements to be made out in detail.

Does your product or process need a plus feature?



TOO many discards? Lost motion? Complaints about the quality of finished products? Has competition got the edge on you with a brand new feature? Some of America's leading organic chemists spend their entire time solving such problems for various manufacturers in the splendidly equipped du Pont research laboratories at Deepwater Point, N. J.

Here are model rubber plants, leather factories, paper plants, printing ink mills, textile works where new formulas, new ideas, new plus features for innumerable products are given a practical work-out.

For instance, du Pont Neozone, the new antioxidant, adds years to the life of rubber. Resisto-Filters have overcome the difficulty of premature failure of cloths for acid filtrations, and the consequent interruption of production and boosting of manufacturing costs. When color became the vogue in the rubber industry, the du Pont laboratories brought forth a full line of organic colors for rubber manufacturers.

ORGANIC CHEMICALS

* * *

Dyestuff Intermediates

* * *

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Accelerators

Antioxidants

Organic Colors

* * *

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Outwear ordinary filter cloths many times

Aside from the working out of a definite problem, the du Pont Company offers a remarkably varied line of organic chemicals. The large consumption of such chemicals by the du Pont Company itself, guarantees you the finest quality and constantly available stocks.

The technical services of the du Pont organic chemical laboratories are freely available for solving problems connected with the use of our products. Let them provide a plus feature for your product or solve that production problem.

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New Incorporations

Eton Products, Inc., Wilmington, Del., drugs, chemicals. 10,000 shs. com. Corp. Trust Co. of America.

Colonial Drugs, Yonkers, N. Y., chemicals. 50,000 shs. H. Rothbut, 15 E. 40th St., New York.

New Jersey Chemical Products Co., Inc., Jersey City, N. J., chemicals. $10,000. Butler & Butler, Jersey City, N. J.

San Diego Lime Products Company, Wilmington, Del., textile mills, plants. $1,500,000; 20,000 shs. com. Corp. Trust Co. of America.

Minsil Corporation, Wilmington, Del., petroleum, asphaltum, mineral gases. $100,000; 9,000 shs. com. Corporation Service Company.

Consolidated Benzol of America, petroleum, 900 shs. com. Battle, Miller, Levy & Van Tine, 37 Wall St., New York.

Rat Snap, Inc., Plainfield, N. J., druggists and chemists. $125,000. Robert Newton Crane, Plainfield, N. J.

Plastic Arts Corp., Wilmington, Del., chemicals. 15,000 shs. com. Corp. Trust Co. of America.

Vitone Products, Mineola, L. I., chemicals. 11,000 shs. com. A. E. MacDougall, 14E. 41st St., New York.

Singmaster & Breyer, New York, chemical engineers. 500 shs. com. Green & Hurd, 52 Broadway, N. Y.

Consolidated Rayon Corporation, Brooklyn, N. Y., 30,000 shs. com. Registra & Transfer Co.

Associated Laboratories of Cuba, Inc., Wilmington, Del. drugs, chemicals. 25,000 shs. Corp. Trust Co. of America.

The C. A. McLarty Chemicals Ltd., Toronto, Ont., $40,000. Harold W. Timmins, Robert E. Grass, James L. Bicknell.

The C. A. McLarty Chemicals Ltd., Toronto, Ont., $40,000. Harold W. Timmins, Robert E. Grass, James L. Bicknell.

The Toronto Salt Works, Ltd., Toronto, Ont., $40,000. George J. Cliff, Harold T. Cliff, Jack Cooper Cliff.

Mid-West Chemical Co., New York, mining, other ores. 500,000 shs. Colonial Charter Co.

Metal Chlorides Corp., Jersey City, chemicals. 10,000 shs. com. Registra and Transfer Co.

Titan Co., Inc., Wilmington, paints, pigments, chemicals, oils. $5,000,000. Corp. Trust Co. of America.

Flexo Manufacturing Co., New York, chemical compounds. 3,000 shs. com. P. R. Cook, New York.

B. S. B. Products Corp., New York, disinfectants. 10,000 shs. H. Bloomgarden, 26 Court St., New York.

Llewellyn Holding Corp., Brooklyn, N. Y., drugs, chemicals, medicines. 100 shs. com. Corp. Trust Co. of America.

White Research Laboratories, Inc., Devon, Pa., manufacturing chemicals, mechanical, electrical, engineering products, 2,000 shs. com. United States Corp. Co.

Wunder Paint Co., New York, chemicals. 10,000 shs. M. L. Kane, 50 Court St., New York.

George Emold Co., Chester, Pa., disinfectants. 25,000 shs. Stage & Stage, Warwick.

Wilts National Veneer Corp., Wilmington, Del., wood and by-products of wood. 1,000 shs. com. Corp. Trust Co. of America.

Bryant Chemical Corp., 10,000 shs., filer not given.

Remuvo Co., Camden, N. J., mfg. chemical, etc., 50,000, shs. com. David J. Kay, Camden, N. J.

Sanite Corp., Burlington, mfg. products from pyroxyline materials. $100,000 pf. 12,000 shs. com. Williams Kessler, New York.

The Oregon Crater Gold and Quicksilver Co., New York City, gold, silver, other minerals. 1,000,000 shs. Prentice Hall, Inc., Delaware.

Dominion Tar and Chemical Co., Montreal, Que., $7,500,000 and 300,000 no par shs. John L. Bishop, Francis G. Bush, Herbert W. Jackson.

Ore Solvents Corp., Wilmington, Del. patents. 205,000 shs. com. Corp. Trust Co. of America.

Bourjois, toilet articles, 100 shs. com. Olvany, Eisner & Donnelly, 292 Madison Ave., New York.

Eastern Silica and Chemical Corp. general mining. 100,000 shs. Colonial Charter Co.

Joanite Corp. resins. 25,000 shs. Pettigrew & Glenneys, 79 John St., New York.

Chemical Products Corp., 50,000 shs. Atwater & Clarke, 2 Park Ave., New York.

Federal Gypsum Co., Wilmington, Del., operate quarries. $150,000, 18,000 shs. com. Corp. Service Co.

Mutuelle Solvay of America, Inc., Wilmington, Del., stocks, bonds. 10,000 shs. com. Corp. Trust Co.

Twelfth Exposition of Chemical Industries, which opens at Grand Central Palace, New York, May 6-11, announces that among the metals group exhibiting equipment will be: Crucible Steel, Vanadium Steel, International Nickel, Duriron, Inert Metal Products, Industrial Welded Products Co., Carpenter Steel Co., Globe Steel Tube Co., Titusville Forge Co., Nelson Metzler Corp., Lalance-Grosjean Mfg. Co., Ludlum Steel Co., Central Alloys Steel Co., Babcock & Wilcox Tube Co., Fansteel Products Co., and Krupp Works, Germany. Export day for foreign buyers will be held May 9.

Davison Chemical Co. is said to be planning to produce all its sulfuric acid by the contact method. A new contact acid plant using silica gel as a mass is said to have produced satisfactory results and other extensions will be made along these lines.

St. Regis Paper Co. acquires the Bates Valve Bag Corp. with assets of nearly $10,000,000. Business is expected to be carried on under same name as subsidiary of the St. Regis company.

Skendandoa Rayon Corp. plans recapitalization to provide additional funds of $3,000,000 for installation of two additional units, which will triple plant capacity.

New Plant Construction

Hiram Walker-Gooderham & Worts, Ltd., Canada, completes installation at Toronto plant for production of 4,000 gallons of rectified spirits per day. A molasses tank of 1,000,000 gallons capacity is also part of the installation. New equipment is for production of denatured alcohol of which the Canadian market consumes 3,000,000 gallons per year.

Du Pont Rayon Co. announces rapid progress on construction of initial unit of new plant at Waynesboro, Va. It is expected that it will be in operation by summer. Cost of first unit will be between $4,000,000 and $5,000,000 and it will have capacity of about 2,000,000 pounds per year.

Louisiana Chemical Co., plans construction of plant at Bastrop, La. First unit is estimated to cost $350,000. Company is affiliated with Stauffer Chemical Co., Texas Chemical Co., Pacific Bone, Coal and Fertilizer Co., and Consolidated Industries, Inc., San Francisco.

Omaha Cornstalk Products Co., Omaha, Neb., plans remodeling of building in that city as plant for manufacture wallboard products, using cornstalks. Project will cost about $400,000 with equipment.

Ultra Chemical Works, Inc., erects new plant at Hawthorne, N. J., with estimated capacity of 1,500 barrels of textile chemical specialties per day. Company is New Jersey sales agent for American Dyewood Co. and Proctor & Gamble Co.

Ozark Chemical Co., Tulsa, Okla., purchases tract of land at Pecos, Tex., for proposed new plant for manufacture of sulfuric acid. Plans are under way for initial units consisting of group of buildings estimated to cost over $200,000 with equipment.

Du Pont Cellophane Co. announces plans for construction of new plant at Old Hickory, near Nashville, Tenn., at estimated cost of several million dollars.

Royal Baking Powder Co. plans construction of plant in South Africa, which will be first established by the company outside of the United States and Canada.

Sherwin Williams Co. purchases six-story building adjoining Cleveland plant which will give company about 215,000 additional feet of floor space. Price was about $300,000.

National Lime, Cement & By-Products Corp., Buffalo, purchases 250 acres of land near Tuscumbia, Ala., as site for new plant to cost about $325,000 with equipment.

Celanese Corp. authorizes erection of new unit to Cumberland, Md., plant to be used bor laboratory and chemical work. It will be two-story and cost over $150,000 with equipment.

Westvaco Chlorine Products Corp., is said to be planning plant expansion. It is expected that an offering of common stock will be made in near future to finance the expansion.

Victor Chemical Works, Nashville, Tenn., plans construction of addition to plant to cost over $450,000 with equipment.

British Dyestuffs Corp., Ltd., plans expansion of plant facilities at Dalton, Huddersfield, with expenditure of £300,000.

Phillips Fertilizer Co., Washington, N. C., plans recetion of new plant in near future.

Texas Gypsum Products Co. is constructing a plant at Finlay, Texas.

Amtorg Trading Corp. leases two floors at 261 Fifth ave., New York.

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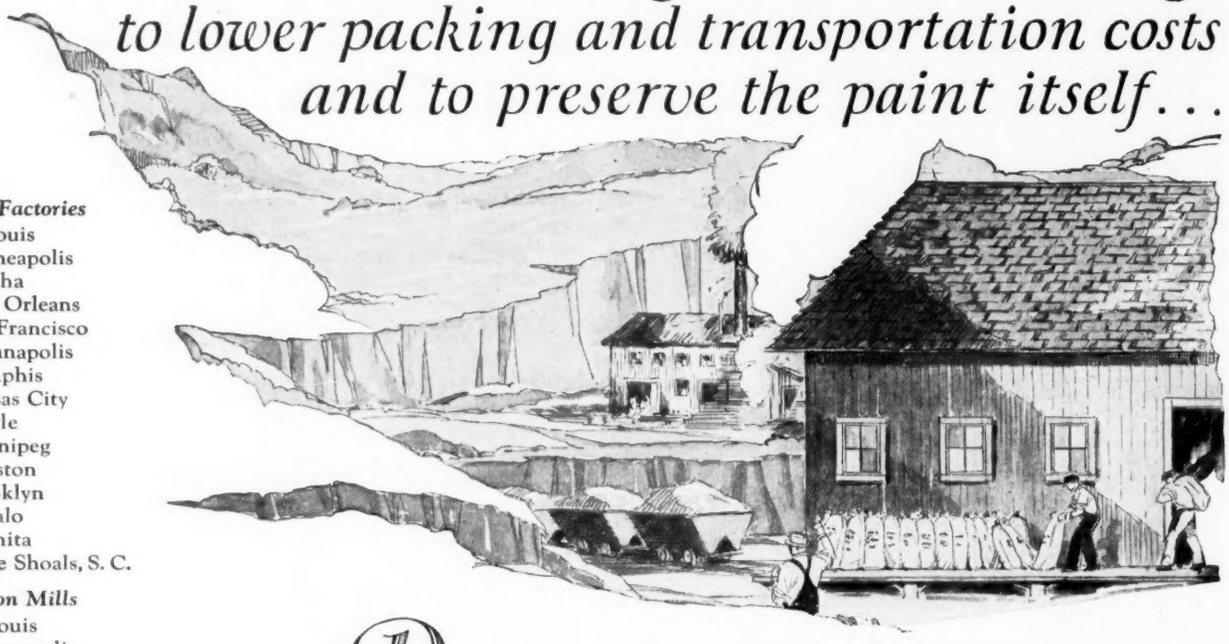

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DRY paint, of course—and that's the point—the paint must be *kept* dry, from the time it is packed until it is mixed and used.

So they ship dry paints in Bemis Waterproof Bags—which protect the paint from loss and deterioration in freight cars and from the elements on platforms and in open trucks.

There's a saving, too, compared with the old way of shipping in barrels—a saving in costs of handling, freight, and storage space—not to mention a lower initial cost.

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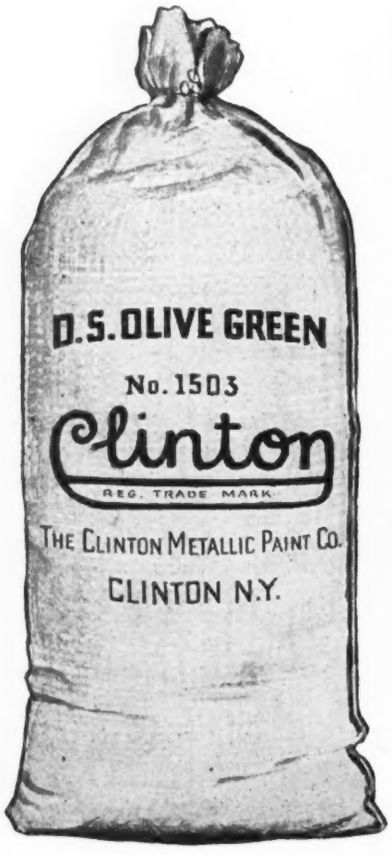

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COTTON - BURLAP - PAPER - PRINTED OR PLAIN

Removing Danger Risks From Chemical Shipments

By Herbert Thompson

Traffic Manager, Union Carbide & Carbon Corp.

ABOUT twenty-five years ago there was a period during which calcium carbide was considered in the same class as traffic which came under the head of "Dangerous or Explosive Articles"—commodities which supposedly involved elements of hazard in handling, transportation and storage. Following a campaign of education and as a result of experience in handling, transportation companies came to understand that there was little, or no hazard in transporting calcium carbide. Existing rules and regulations covering all rail traffic do not provide specifications as to size, gauge of steel, etc., for the shipping containers used, the only restrictions being that the railroad freight classification does provide that calcium carbide must be shipped in iron or steel barrels (drums); in corrugated cans weighing not less than 25 pounds each when filled, or in metal cans packed in barrels or boxes. No special provisions are made as to the manner of loading or arrangement of the load and no placards or markings indicating character of contents of cars are required.

The container most extensively used in shipping calcium carbide—the 100 pound non-returnable drum—has been so universally recognized as an ideal shipping package, that manufacturers and shippers of many other commodities have adopted substantially the same kind of container or package, a fact which has been a source of much satisfaction on the part of railroads and transportation companies generally. The term "Carbide Drum" has become recognized throughout all transportation circles as suggesting an extremely substantial package, assuring maximum protection to the shipper and to the transportation companies alike.

During a period of eighteen years from 1910 to 1928, the records show that there were fourteen accidents in transportation involving calcium carbide in connection with which there was absolutely no loss of life and no injury to persons, and that the property loss was so insignificant that it is generally considered negligible, especially when one considers the many thousands of tons, which are moving annually. A very remarkable and creditable record.

The complete absence of hazard in transporting calcium carbide is further confirmed by the fact that during a recent year one of the large calcium carbide manufacturers and shippers filed against the transportation companies only ten claims for loss or damage to shipments. The total amount of these claims was $308.31, and the loss or damage in all cases was caused by railroad wreck, carelessness or negligence in transferring the contents of cars found to be in bad order, or by rough or improper handling by railroad employees. The year taken as an example is fairly representative, but if anything, the number and money value of claims filed are high.

Containers such as these, used in transporting oxygen, acetylene and calcium carbide, have proven invaluable in removing hazards in storage and shipment.

That calcium carbide is highly desirable traffic from the standpoint of transportation companies is confirmed by the fact that railroad officials frequently make the statement that they wish there was more carbide tonnage moving over their lines, as there is no traffic in connection with the handling of which, so few, if any, difficulties are encountered.

The movement in transportation of dissolved acetylene and

DICHLOR ETHYL ETHER

A high-boiling low-priced chlorinated solvent

THE Carbide and Carbon Chemicals Corporation is pleased to announce the commercial availability of another synthetic aliphatic organic chemical—Dichlor Ethyl Ether.

Dichlor Ethyl Ether ($CH_2Cl.CH_2O.CH_2CH_2Cl$) is a high-boiling solvent, somewhat similar to Ethylene Dichloride in odor and in general solvent properties. Its boiling point is 178°C., it is practically insoluble in water but is soluble in alcohol, ether and gasoline.

The solvent properties of Dichlor Ethyl Ether for grease and dirt are excellent and it possesses the further advantage of being harmless when used on cellulose acetate (Celanese) silk.

The high boiling point of Dichlor Ethyl Ether suggests its use as a spotting agent for professional dry cleaners. Ethylene Dichloride, on the other hand, having a much lower boiling point (83°C.), is better for household use as a spot remover. Dichlor Ethyl Ether is valuable as a constituent of liquid textile soaps, as a cleaning agent for metal parts and as a general all-round chlorinated solvent of high boiling point. The price is particularly interesting.

Further information on its various applications may be obtained by addressing

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Carbide and Carbon Building

30 East 42nd Street, New York, N. Y.

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Unit of Union Carbide and Carbon Corporation

the return of empty cylinders amounts to well up toward half a million tons annually. We are, therefore, discussing an article which is important from a transportation standpoint because of the volume of the traffic. Taking again the period of 18 years from 1910 to 1928, the records show a total of fifty-nine accidents in transportation involving dissolved acetylene. Of this total a third represents leakages only and a large part of the balance occurred during the early part of this period, showing very clearly that the risk in handling acetylene has been reduced to a minimum. As in the case of calcium carbide, the property or financial loss was negligible. One of the largest producers of acetylene in the country filed no claims during a recent year covering damage to either full or empty acetylene cylinders. This is rather an unusual record for any commodity, but it is representative of the existing situation relative to claims covering these cylinders.

It is estimated that the movement of oxygen and the return of empty cylinders amounts to considerably over a million tons annually, a very large traffic, particularly, when you take into consideration the character of the article transported. It will, therefore, be particularly interesting to note that during a period of eighteen years there were only forty-one unfavorable incidents in transportation involving oxygen. Thirty-two of these covered simply loss of gas due to defective valves or to the blowing out of safety devices. The total property or financial loss for the period of eighteen years was only $5,006.00. During a recent twelve months period one of the largest oxygen producers filed only two claims for damage to cylinders amounting to $70.00. Again, both accident and claim records are rather remarkable considering the large amount of traffic.

The equipment, such as generators, piping, welding rods, blow pipes, etc., used in connection with carbide, acetylene and oxygen industries, represents a very large tonnage and involves no element of hazard, regardless of the conditions under which it may be transported or stored.

In conclusion, and as a further confirmation, if any is really needed, as to the safety—with reasonable care and the use of common sense—in transportation of carbide, acetylene and oxygen, the following statement may be of interest. With the better knowledge acquired over a long period of years as to the quite complete absence of hazard in the handling, storage and transportation of the commodities mentioned, when the question of rates or classification on these commodities comes up for consideration by Railroad Rate or Classification Committees, no such group now suggests or infers that rates or classification should reflect in the slightest degree the old fallacious idea that there is any marked element of hazard in the transportation of these commodities. This fact in itself indicates plainly the deserved attitude of transportation companies toward these industries.

Freight Rate Decisions

Interstate Commerce Commission announces following freight rate decisions: The freight rate on linseed oil in southern territory should not exceed the rate on cottonseed oil. Increased freight rates on cyanamid and crude cyanide from Niagara Falls, Ont., to United States Atlantic Coast tidewater points go into effect as the Commission has no authority to pass on joint through rates between points in the United States and points in Canada. The proposed cancellation of joint through commodity rates on tankcar shipments of blackstrap molasses from Wilmington, N. C., to Columbus and Toledo is suspended. Interstate rates on fertilizers maintained in Louisiana, west of the Mississippi, are so low as to constitute an undue preference to intrastate traffic and unjust prejudice to interstate traffic.

New York State Public Service Commission approves following: New freight rates of the New York Central (East) on benzol, in packages, carload, minimum weight 30,000 pounds, and in tankcars, carload, from Black, Rock, Buffalo, and East Buffalo to stations on Fonda, Johnstown & Gloversville:—Johnstown, of 32 cents; Gloversville, 33.5 cents; Broadabin and Mayfied, 35 cents; Cranberry Creek, 37 cents; Sacandaga and Northvie, 41.5 cents. New freight rates of the New York Central (East) on ammoniacal liquor and aqua ammonia in tankcars, carload, from Solvay and Syracuse to Rensselaer, of 15.5 cents, a reduction of six cents per hundredweight.

A reduction of one cent per hundredweight in the freight rate on muriatic, nitrating, and sulphuric acids for the Delaware, Lackawanna & Western Railroad with respect to carload shipments from Black Rock, Buffalo, East Buffalo, Harriet, and Kensington, to Depew. The new rate is seven cents per hundredweight.

Wilson & Bennett Manufacturing Co., Chicago, steel containers, announces that George L. Gillon, formerly the company's New York representative, has been appointed district manager, with offices in New York. He will be assisted by R. B. Charlebois, who has been transferred from the Chicago office.

Central Chemical Co., Kokomo, Ind., files a complaint with the Interstate Commerce Commission declaring that the freight rates on alumina sulfate from Kokomo to destinations in Michigan and Minnesota are prejudicial in comparison with the rates from Chicago Heights and Joliet, Ill.

Latest issue of "The Hydraulic Press", published by Hydraulic Press Manufacturing Co., Columbus, contains articles on the uses of this type of equipment in the ceramic and rendering industries.

Brown Instrument Co., Philadelphia, announces that its Buffalo office is now located at 402 Marine Trust Building, and that O. B. Wilson is now in charge of the company's Cleveland office.

E. I. du Pont de Nemours & Co., Inc., constructs the first nitric acid tank car to be used in the United States. It is 31 ft. 9 in. long, has an inside diameter of 6 ft. 1.5 in., and has a capacity of 7,000 gallons.

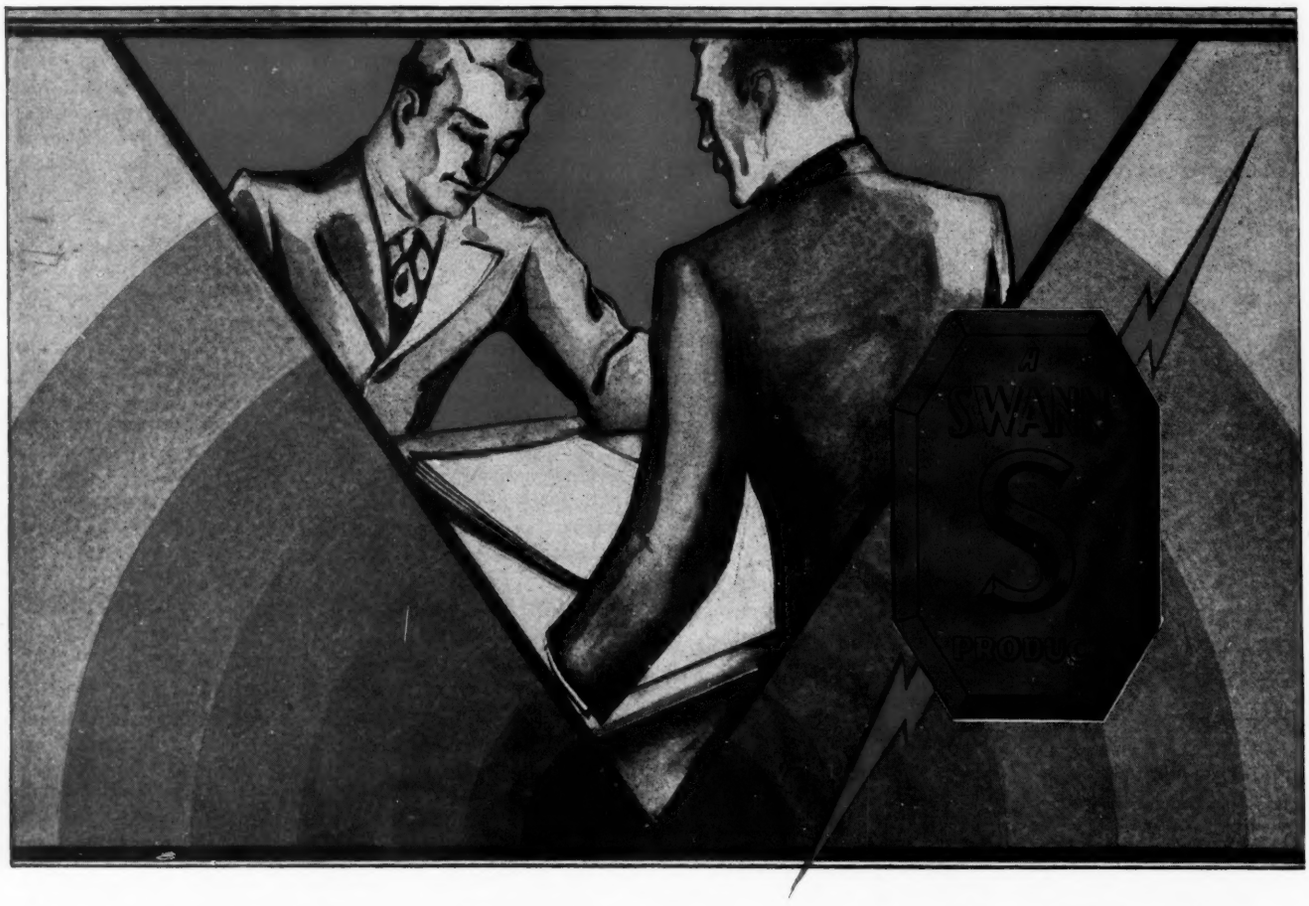
Northern Blower Co., Cleveland, dust-collecting equipment, is enlarging plant by addition of 9,375 sq. ft. of manufacturing floor space.

Connersville Blower Co., Connersville, Ind., issues bulletin 121, giving operating features and successful applications of Victory Rotary Positive Blowers.

U. S. Stoneware Co., New York, announces new acid-proof cement, designated by the trade name of "U. S. Standard."

Du Pont Cellophane Co. announces addition of T. W. Holland to New York sales force.

A guide for buyers and plant executives



The Mark of Swann Products is a mark of value which identifies products produced by the four Divisions of The Swann Corporation. Buyers and Plant Executives will find it a dependable guide at all times.

Divisions of THE SWANN CORPORATION *and Their Products*

Federal Phosphorus Company
Birmingham, Ala.

Phosphoric Acid 75% H_3PO_4
Phosphoric Acid 50% H_3PO_4
Mono Sodium Phosphate
Tri Sodium Phosphate
Acid Sodium Phosphate, Pyro
Mono Ammonium Phosphate
Di Ammonium Phosphate
Di Calcium Phosphate
Tri Calcium Phosphate
Phosphoric Acid Paste

Diphenyl

Textile Oils and Chemicals

Federal Abrasives Co.
Birmingham, Ala.

Aluminous Oxide Abrasive Grain
Silicon Carbide Abrasive Grain

Southern Manganese Corp
Birmingham, Ala.

Ferro Phosphorus 24% P
Ferro Phosphorus 18% P

Provident Chemical Works
St. Louis, Mo.

Mono Calcium Phosphate (H. T. Phosphate)
Phosphoric Acid
Acid Calcium Phosphate
Pyro Calcium Phosphate
Di Calcium Phosphate
Tri Calcium Phosphate
Pyro Sodium Phosphate
Tri Sodium Phosphate
Crystalline Phosphate, etc.
Calcium Phosphate
Bicarbonate of Soda
Sodium Aluminum Sulphate
Laundry Soap Builders

The SWANN CORPORATION
Birmingham, Alabama — Anniston, Alabama — St. Louis, Missouri.

Foreign Chemical Activities

Russian imports of German chemicals during the first nine months of the "economic year" (1927-1928, beginning from October 1, 1927) amounted in value to 8,200,000 rubles as compared with 6,000,000 rubles for the corresponding period of the preceding economic year, reports Consul Robert W. Heingartner, Frankfort-on-the-Main, Germany. (1 ruble = $0.5146 United States currency). The German share in the Russian imports of chemicals amounted to 68 per cent. Russian imports of German dyestuffs, which are not included under chemicals, amounted in value to 7,400,000 rubles as compared with 4,800,000 rubles during the corresponding period of the preceding economic year. German dyes made up 81 per cent. of the total Russian imports of dyes.

I. G. Farbenindustrie reports that business in dyestuffs has been progressing satisfactorily, especially in the Far East, while there is a general tendency towards faster and more expensive colors. General chemical sales have been good and the report particularly stresses the fact that sales of Nitrophoska fertilizers have nore than come up to expectations.

A record production of 2,623,000 metric tons of crude potash salts was made by the Alsatian potash mines in 1928, according to the Department of Commerce. This was an increase of 300,000 tons over their output in 1927. The 1928 production was equivalent to 410,316 metric tons of pure potash (K_2O).

German manufacturers of boric acid and borax have ceased procuring supplies through the firm with which they have long dealt. They are said to have secured new and independent sources of supply and prices will be dictated solely by the needs of the market in the future.

Consolidated Mining & Smelting Co., Trail B. C., having completed extensive experiments on its phosphate deposits in Manitoba, Alberta and Saskatchewan, plans expenditure of about $15,000,000 to establish production of fertilizers on large scale.

Chemical works of E. Merck, Darmstadt, owners of a new process for dehydrating ethyl alcohol have granted a license to an important British firm, and a plant for dehydrating ethyl alcohol is to be erected near London.

Societe Belge d'Electrochimie, capitalized at 21 million francs is about to undertake the manufacture of calcium carbide and cyanamid on a large scale in that country.

Etablissements Kuhlmann increases capital stock from 250,000,000 to 300,000,000 francs. Application has been made for listing of company's stock on New York Stock Exchange.

Britain imported 13,118 tons of acetic acid in 1927, of which amount, the United States furnished only 150 tons as compared with 7,260 tons from Canada, and 4,025 tons from Germany.

Shawinigan Chemicals, Ltd., is conducting experiments at Shawinigan Falls, Que., with a view to the extraction of sulfur from sulfide ores.

Synthesia Chemical Works is organized in Czechoslovakia with capital of 12,000,000 crowns ($360,000) to produce synthetic nitrogen products.

Imperial Chemical Industries acquires Malagash Salt Co., Nova Scotia.

Leunawerke Plans To Increase Nitrogen Capacity To 536,000 Tons

Ammoniakwerk Merseburg G. m. b. H. (so-called "Leunawerke"), the world's largest air-nitrogen fixation plant, located about 80 miles south of Berlin, in the past few months has effected enormous increases in production of fixed nitrogen in ammonium sulphate and calcium nitrate and of its synthetic motor fuel obtained by lignite hydrogenation.

Fixed nitrogen production of Leunawerke, at present 1,400 tons of nitrogen daily, or over 500,000 tons annually, is to be raised presently to 1,500 tons daily, or another 36,000 tons annually. The I. G.'s other nitrogen-fixation plant, Oppau at Ludwigshafen, accounts for a further 100,000 to 150,000 tons of fixed nitrogen annually. These figures make a total German dye trust production of a maximum of 650,000 tons annually, or easily 80 per cent of the present total German production, including the 75,000 tons of fixed nitrogen produced each by the calcium cyanamide and the coke and gas plant groups.

Of Leunawerke's fixed-nitrogen production, around 80 per cent. enters ammonium sulphate and 20 per cent. calcium nitrate, despite expectations and the I. G.'s announced program that calcium nitrate production would be immediately extended at the sacrifice of some ammonium sulphate, which seemed to threaten over-saturation of the market a short time ago.

Contrary to repeated overestimates, by the press and others, of "Leunawerke's" production of synthetic motor fuel, the new "oil from coal" plant adjoining the master ammonia operation is actually producing at the rate of 100 tons daily, or 36,000 tons annually. The 1929 production program calls for 300 tons daily, or 100,000 tons annually. This production does not offset by a considerable figure the normal annual increase in gasoline consumption in Germany.

The present consumption of gasoline amounts to 700,000 to 800,000 tons annually, most of which originates in the United States. Exactly how large the eventual figure of annual production of synthetic fuels will be can not be forecast with any degree of accuracy, but it is very doubtful that the United States petroleum exports to Germany will be seriously affected by "synthetic" competition in the immediate future.

The same may be said substantially of Leunawerke's production of sulphur, now at the rate of 15 tons daily as compared with 10 tons daily previously. Elemental sulphur is recovered by filtration through activated carbon as a first-stage impurity separation in the producer and water-gas mixture entering the process of direct ammonia synthesis. Comparing the Leunaweke sulphur production with imports, chiefly from the United States, it is observed that the former figure is but one-tenth of the latter; nevertheless, the removal of sulphur as an impurity from the gas mixture is an absolutely essential operation regardless of cost.

Imports of coal tar dyes in 1928, according to the Department of Commerce, totaled 5,348,227 pounds, valued at $4,322,621, compared with 4,233,046 pounds valued at $4,413,886 for the corresponding 1927 period.

Percentage of total imports during 1928, classified as to method of application, follows:

Acid dyes, 18.56; vat dyes, 43.30; mordant and chrome dyes, 8.92; direct dyes, 17.14; basic dyes, 7.95; sulphur dyes, 2.34; spirit-soluble and color-lake dyes, 1.61; unidentified, unclassified special dyes, .18.

Profit of Courtaulds, Ltd., for year ended December 31, 1928, was £5,171,996 after expenses, depreciation, taxes, etc., but before appropriation for general reserve, comparing with £4,585, 921 in 1927. There was set aside £1,000,000 or general reserve comparing with same amount in preceding year.

Courtaulds, Ltd., declared a final dividend of 10%, tax free, on the common stock, bringing total payments for the year to 15%.

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Etablissements Kuhlmann Acquires Interest in Another French Company

Etablissements Kuhlmann has become interested in the Societe des Engrais et Produits Chimiques de la Meuse, Belgium, which has a capital of 60,000,000 francs. The latter company has its plant near Liege, and it is said that it will commence the manufacture of synthetic ammonia by the process of an American company for which the rights in France and Belgium are held by the Kuhlmann Company.

Furthermore, it has been announced that the Societe des Engrais et Produits Chimiques de la Meuse has given the Kuhlmann Company 3,000 shares, worth 500 Belgium francs each, 1,500,000 Belgium francs in specie and 33,000 of the 120,000 founder's shares which have been created. On the other hand, the Kuhlmann Company has underwritten a part of the capital of the Belgium concern and will be represented on the board of directors, according to Assistant Commercial Attache Daniel J. Reagan, Paris.

Texas Panhandle within the past year has taken the lead in output of carbon black with daily production of around 400,000 pounds. Sixteen plants are either in operation or under construction in four Panhandle counties and value of estimated annual production amounts to $10,000,000. Daily output will amount to $28,000, upon completion of new plants under construction. More than half of the world's carbon is now coming from the Panhandle area.

Exports of phosphate rock from French North Africa for the first six months of 1928, totalled 1,857,902 tons.

Lord Birkenhead receives honorary degree of Doctor of Laws, Trinity College, Dublin.

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HOWARD B. BISHOP, President

Chemical Facts and Figures

Consent Decree Settles Government's Potash Suit

Franco-German Producers Agree to Observe Anti-Trust Laws and Refrain From Price-Fixing and Discrimination—Agreement Ends Suit Brought Against Importers in 1927

Potash imports and sale by the so-called Franco-German potash syndicate now have the sanction of the Government according to the terms of a consent decree entered February 28, in the District Court, Southern District of New York, enjoining the corporate defendants from further operations under agreements respecting distribution and sale of potash in the United States in violation of anti-trust laws. This disposes of the suit of the Government against the Deutsches Kalisyndikat Gesellschaft and the Societe Commerciale des Potasses d'Alsace, which was begun in April, 1927, by the Department of Justice which alleged that a group of French and German potash producers were in New York to complete arrangements with American distributing agents for the creation of a monopoly.

It also was alleged that the foreign producers had reached an agreement effective May 1, 1927, for the division of the United States business, but that the defendants had been dividing the potash trade since August, 1924. Government agents reported that 1,000,000 tons of potash worth $50,000,000 were imported annually, that 90 per cent. of it was sent here by the defendants, the German producers providing 70 per cent. of this and the French the remainder.

The degree binds the principal defendants and their agents to observe the anti-trust laws and enjoins them from fixing resale prices or unfair discrimination among purchasers. Jurisdiction is retained by the court to enforce the decree and to correct any inadequacies or inappropriate provisions as the business develops.

Almost from the beginning of the litigation proposals for settlement were made on behalf of the defendants and that they worked out and submitted to the Attorney General a new method of distributing potash in the United States pending trial of the action, and the plan was accepted by the Department of Justice until an adjudication could be obtained.

The announcement of the decree was accompanied by a statement in behalf of the Assistant to the Attorney General, William J. Donovan, in which the court was advised that the decree accomplished the purposes sought by the Government when the original petitions for injunctions were filed.

The statement revealed that Mr. Donovan had conferred with representatives of the foreign defendants in Chicago, February 24, at which time the intention of the defendants to agree, in principle, to the Government demands was made known. It was explained further in the statement that the Government believed the prohibition now laid down on the coprorate defendants was all that was necessary, and it accordingly moved dismissal of the individual actions.

Drug and Chemical Club, New York, elects following members of the board of governors for the term ending February, 1932: Henry G. Sidford, National Lead Co.; Frederick H. Lelonhardt, Fritsche Bros.; Arthur M. Murray; Robert C. Cox, Krebs Pigment & Chemical Co.; Charles J. A. Fitzsimmons, Orbis Products Trading Co.; and Alva R. Hanners.

Plans Completed for Drug and Chemical Dinner, March 14

Drug & Chemical Section, New York Board of Trade, completes plans for the fourth annual dinner of the drug, chemical and allied trades at the Hotel Waldorf-Astoria, New York, March 14. Dr. A. R. L. Dohme, president, Sharp & Dohme, Inc., Baltimore, will act as toastmaster, and the speakers of the evening will be Dr. Royal S. Copeland, United States Senator from New York, and Congressman Harold J. Hoffman of New Jersey.

The usual reception will precede the dinner for which reservations are being made at $6.50 per plate. It is confidently expected that about 500 reservations will be made before the date of the dinner. Among the firms which have reserved full tables thus far are Monsanto Chemical Co. Roessler & Hasslacher, S. B. Penick & Co., Mallinckrodt Chemical Works, Upjohn Co., Charles L. Huisking & Co., Kuttroff-Pickhardt Co., Magnus, Mabee & Reynard, New York Quinine & Chemical Works, and Eli Lilly & Company.

Harshaw, Fuller & Goodwin Co. Changes Name to Harshaw Chemical

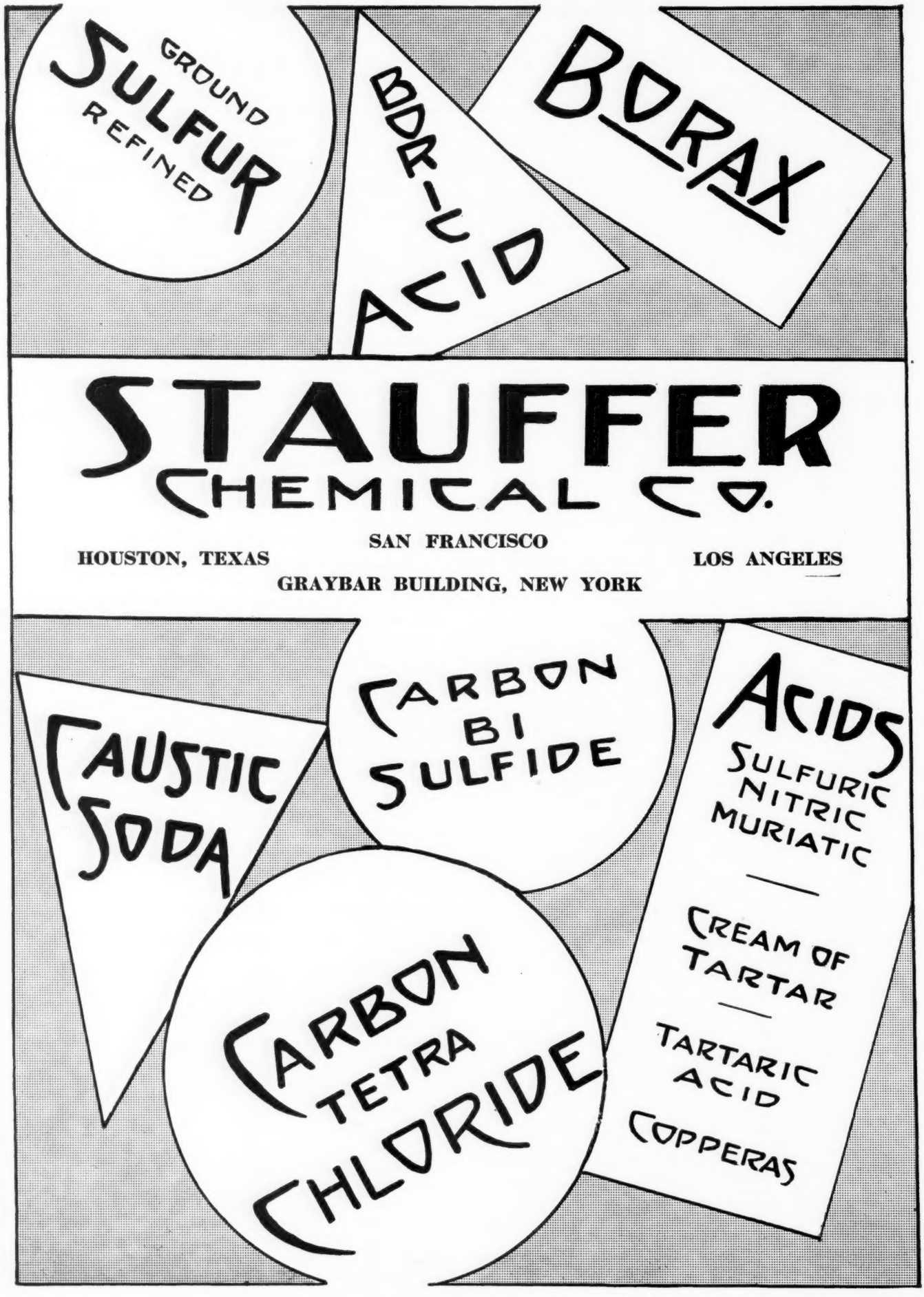
Harshaw, Fuller & Goodwin Co., Cleveland, changes corporate name to Harshaw Chemical Co., and re-organizes capital structure, increasing the number of shares of its common stock and making it no par instead of $100 par value. It is felt that the new name will better identify the nature of the company's business.

The company was organized in 1892 as the Cleveland Commercial Co., and reorganized in 1898 as the Harshaw, Fuller & Goodwin Co., with headquarters at Elyria. This most recent change is accompanied by the retirement of the president, J. A. McGean, and the vice-president, his son, Ralph L. McGean. H. A. Harshaw has been elected president to succeed the former. The company has also announced that Fuller has not been connected with the company for several years and that Goodwin, while a stockholder, is not active.

Another Merger of Alcohol Producers Said to Be Forming

General Industrial Alcohol Co., New Orleans, National Industrial Alcohol Co., New Orleans, Greendale, Co., Lawrenceburg, Ind., and the Bay City Co., Bay City, Mich., are said to be planning another merger in the alcohol field. All are under option and negotiations are said to be proceeding rapidly. Total capacity of the merged company would be about three or four million wine gallons it is said. It is thought that manufacturing operations will be centralized at New Orleans and the other plants used as distribution points.

Nominating committee, Chemists' Club, New York, presents following nominations for year 1929-30: president, L. V. Redman; resident vice-president, H. B. Bishop; non-resident vice-president, Edward R. Weidlein; secretary, Robert T. Baldwin; treasurer, Ray Harcombe; trustees, E. J. Barber and G. O. Curme, Jr.


GROUND
SULFUR
REFINED
BORIC
ACID
BORAX
STAUFFER
CHEMICAL CO.
SAN FRANCISCO
HOUSTON, TEXAS
LOS ANGELES
GRAYBAR BUILDING, NEW YORK
CAUSTIC
SODA
CARBON
BI
SULFIDE
ACIDS
SULFURIC
NITRIC
MURIATIC
CREAM OF
TARTAR
TARTARIC
ACID
COPPERAS
CARBON
TETRA
CHLORIDE

Personal and Personnel

Lewis H. Marks, executive secretary, Industrial Alcohol Institute; Dr. William Hale, Dow Chemical Co.; C. C. Concannon, chief, Bureau of Chemistry, Department of Commerce; Dr. E. R. Weidlein, Mellon Institute; Dr. Charles H. Herty, Chemical Foundation; and Dr. Eloise Gerry, United States Forest Products Laboratory; are among the speakers at the 1929 meeting of the Pine Tree Chemical Industry, the Pine Institute of America, and turpentine interests at Pensacola, Fla., February 20 to 22.

Prizes awarded annually by the Hon. Herman A. Metz to pupils of Textile High School, New York, are awarded this year to Dorothy Neuschwander and Chi Ju Chen in batik and dyeing; and to L. Levinson and J. Colligan in chemistry and dyeing.

Samuel Wylie Miller, consulting engineer, Union Carbide & Carbon Research Laboratories, Long Island City, since 1921, and an authority on welding chemistry and engineering, dies in Hollis, L. I., February 3, aged 62.

J. H. Wadsworth, secretary, Imperial Chemical Industries, since its incorporation, is appointed to the board and executive committee of the company, being succeeded as secretary by P. C. Dickens.

Sewell I. Avery, president, U. S. Gypsum Co., is one of the directors of the newly-organized Chicago Corp., Mid-West investment and finance company.

Lammot Du Pont, president, E. I. du Pont de Nemours & Co., Inc., is chairman of the board, General Motors Corp., succeeding Pierre S. Du Pont, resigned.

Elon H. Hooker, president, Hooker Electrochemical Co., is a member of the committee to promote a State-wide economic congress in New York in April.

C. P. Jackell, Anglo-Chilean Consolidated Nitrate Corp., and T. Johnston, Guggenheim Bros., sail for Chile and the nitrate market becomes firmer.

Dr. Edward Weston presents American Electrochemical Society with fund of $25,000, the interest of which will be used to establish a fellowship for research in electrochemistry.

Dr. E. H. Killheffer, for past ten years vice-president, Newport Chemical Works, Inc., Passaic, is elected president of the company, succeeding Armand A. Schlesinger, resigned.

Mr. and Mrs. Francis P. Garvan donate $200,000 to Woodstock College, Woodstock, Md., for construction of new library building.

Frank J. Roe, secretary, P. & P. Derode Freres & Dammann, Inc., New York, dies February 9, aged 68.

John C. Taliaferro, a vice-president and one of the founders, Continental Can Co., dies in Baltimore, February 10, aged 70.

Dr. Franz Oppenheim, president, Agfa Co., Berlin, an important subsidiary of the I. G., dies February 15, aged 77.

Oliver G. Jennings is elected a director, U. S. Industrial Alcohol Company.

G. H. Phillips and R. C. Thomas resign as directors, Devoe & Raynolds Co.

Muscle Shoals Bill Finally Placed on House Calendar

Bill accepting proposal of American Cyanamid Co. to lease the government's Muscle Shoals property finally is placed on calendar of the House, February 18, to the accompaniment of long argument concerning legality and parliamentary procedure The bill was had been under consideration by the committee on military affairs of the House, and was at one time apparently killed in committee. But other meetings were subsequently held at which the bill was favorably reported, and although the chairman was not present. Speaker Nicholas Longworth has ruled that the committee action in reporting it was legal and the bill was placed on the calendar. The final outcome is still doubtful but it seems certain that no further action will be taken before the next session of Congress.

Offer Made to Purchase Cook, Swan & Young Corp.

Gilbert P. Smith, president, and Howard Smith, a director, offer to purchase properties of the Cook, Swan & Young Corp., at Bayway, N. J., for $245,000. Offer was made at hearing in connection with company's affairs in the Federal Court, New York, and covered land, buildings, machinery, tank-cars, and name and good-will of company. Offer was also made to take over inventories of the company on basis of discounts ranging from 10 to 20 per cent. from inventory costs. Counsel for minority stockholders opposed acceptance on grounds that the amount was insufficient and that properties would have to be disposed of at public auction.

American Telephone & Telegraph Co. plans construction program of nearly $82,000,000 on new long distance facilities during 1929, an increase of 67 per cent. over amount spent in 1928. Day rates on long distance calls have also been lowered for the third time in two years. Under the new schedule the station-to-station day rate for three minutes on a call from New York to Cleveland, or from Chicago to either Pkittsburgh or Omaha, is reduced from $2.05 to $1.80. New York-Chicago calls now cost $3 instead of $3.25. Charges on Denver-San Francisco or New York-Palm Beach calls have been cut from $4 to $3.75.

Manufacturers and dealers of bleached shellac plan to hold a trade practice conference under auspices of Federal Trade Commission, at which price discrimination, price changes, rebates, specifications, adulteration and other subjects of interest to the trade will be considered.

By-Products Coke Corp. reports for year ended December 31, 1928, net profit of $1,354,124 after depreciation, interest and federal taxes, equivalent to $7.13 a share earned on 189,936 no-par shares of common stock. This compares with net profit of $1,030,228 or $4.84 a share on common in 1927, after premium on preferred stock retired.

Dyestuffs department, E. I. du Pont de Nemours & Co. announces following new colors: Pontacyl Green S, Pnosol Brilliant Yellow 4G Double Paste, and Du Pont Methylene Blue N.

Chemical Industries Corp. purchases 40 per cent. interest in Merlin Products Corp., household cleansers. Latter company has leased plant at Bush Terminal, Brooklyn.

Schering Corp. is organized in New York to import products manufactured by Schering-Kahlbaum A. G., Berlin, formerly handled by C. B. Peters Co. E. R. Dick is general manager.

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Warehouses throughout the country. Our own tank cars —steamers—storage tanks. Eight large producing plants. Never a let-down in operation. Never a shortage in any of the alcohol products you may want.

And a distribution system—a delivery service—that brooks no delay in putting the goods on your doorstep!

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U. S. INDUSTRIAL CHEMICAL CO., INC.
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Sole Manufacturers of PYRO—the standard anti-freeze

News of the Companies

Solvay Process Co. purchases Adams-Buffer Co., Chaumont, N. Y., and thus acquires 119 acres of additional limestone property along Lake Ontario shore, near that city. Company already had extended holdings in that section and will be able to ship limestone to Syracuse plant by railroad. Extension of quarry holdings is in anticipation of eventual exhaustion of quarry at Jamesville, N. Y.

J. T. Baker Chemical Co., Phillipsburg, N. J., announces appointments of Donald H. Coale as assistant sales manager, and of Louis D. Etman as New York manager. The former has been New York manager for the past two years, while his successor joined the company last year, having formerly been assistant manager, Powers-Weightman-Rosengarten Co., N. Y.

Sales offices of the acid and dry color divisions, E. I. du Pont de Nemours & Co., Inc., formerly located in Newark, N. J., are moved to the offices of the Grasselli Chemical Co., New York. Under terms of recent agreement between two companies, the du Pont business in heavy chemicals, acids and dry colors will be operated as the Grasselli Chemical Co.

American Solvents & Chemical Corp. announces removal of executive offices to new Chanin Building, 122 E. 42 st., New York. Company will occupy entire thirty-second floor. Telephone number, Caldonia 1128, remains unchanged.

I. G. Farbenindustrie concludes working agreement with Chemische Werke Lothringen, fertilizers, capitalized at about $1,500,000. Holders of stock may exchange shares for stock in the I. G.

Monsanto Chemical Works announces that J. R. Mares, patent attorney, has joined its legal department as patent advisor and will be in charge of all patent and trade-mark matters.

Policyholders Service Bureau, Metropolitan Life Insurance Co., publishes booklet entitled, "Rayon: A New Influence in the Textile Industries", which may be obtained upon application to the bureau.

American Cyanamid Co. purchases limestone quarry in Canada to obtain additional reserves of lime for plant at Niagara Falls. About 10,000 shares of B Common were issued in payment for the property.

Prest-O-Lite Co., Inc., acquires business of Acetylene Products Co., which operated two acetylene producing plants located respectively at Phoenix, Ariz., and El Paso, Tex.

Jefferson Lake Oil Co., drilling for oil in Iberia parish, La., uncovers a sulfur deposit which may have commercial possibilities.

Liquid Carbonic Corp. acquires all assets of General Carbonic Co., including eight plants.

Johns-Manville Corp. acquires Banner Rock Products Co., Alexandria, Ind., largest producer of rock wool.

Fabrics Finishing Corp., New York, increases capital from 1,000 to 130,000 shares no par.

Industrial Alcohol Institute announces removal of offices to the Graybar Building, New York. Telephone—Lexington 6825.

Pennsylvania Sugar Co. Acquires Interest in Franco-American

Pennsylvania Sugar Co. acquires a substantial interest in the Franco-American Chemical Works, Inc., Carlstadt, N. J., manufacturer of industrial and pharmaceutical chemicals since 1900. Organization of the latter company will remain intact with M. Trubek continuing as vice-president, in charge of production and research. W. H. Hoodless, vice-president and general manager, Pennsylvania Sugar Co., president of the company, while A. K. Hamilton is vice-president in charge of sales. Other officers are, H. H. Jones, secretary and treasurer, and Guy Adolphi, assistant secretary and treasurer. Directors are: John McCarthy, president, Pennsylvania Sugar Co., Louis Kolb, W. H. Hoodless, M. Trubek, and A. K. Hamilton. Sales and distribution of the products of the Franco-American Chemical Works, Inc., will be handled by the sales representatives of the alcohol division, Pennsylvania Sugar Co., under the supervision of A. K. Hamilton, 95 Wall Street, New York.

I. G. Representatives Sail for U. S. with Plans for Holding Company

Dr. Carl Bosch, president, I. G. Farbenindustrie, sails, and several directors and chemists of the organization, plan to sail, for the United States in connection with plans to establish a holding company and possibly organize production in this country.

I. G. Farbenindustrie approves working agreement with the new International Company for chemical enterprises at Basle, Switzerland. The Swiss Company is to increase its capital to $48,250,000 so as to acquire shares in other companies whose possession would be to best interests of the I. G. The latter is then to be given options on these holdings of the Swiss concern.

Sherwin Williams Co. declared an extra dividend of 25 cents on the common and the regular quarterly dividends of 75 cents on the common and $1.50 on the preferred A. The common is payable February 15 to stock of record January 31 and the preferred March 1 to stock of record February 15. Three months ago an extra dividend of 25 cents was also paid, previous to which quarterly extras of 12½ cents had been paid.

Elizabeth Blee Frasch Fund for "research in the field of Agricultural chemistry" makes following awards for five-year period: Boyce Thompson Institute, $20,000 annually; University of Missouri, $12,000 annually; and University of Wisconsin, $8,000 annually.

Carbide & Carbon Chemicals Corp. announces price reductions in ethylene glycol, diethylene glycol and other members of its group of solvents. Details may be found in the price current section.

Charles Warner Co., Wilmington, completes purchases of business and holdings of Van Sciver Corp., Philadelphia, lime products. Sales is said to involve about $10,000,000.

Chemical Holding Co., Apollo, Pa., increases capital from 500 to 1,000 shares, no par.

Treasury Department grants drawback on dyes, aniline, in dry form, manufactured by Sandoz Chemical Works, Inc., New York.

Grasselli Dyestuff Corp. changes name to General Aniline Works, Inc., New York.

Cellulose Acetate

Stability - Low Acidity
Clarity - Uniformity

Acetic Anhydride (90/95%)

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American Agricultural Chemical Wins Suit Against Subsidiaries

American Agricultural Chemical Co. wins suit in Suffolk Superior Court, Boston, against officers of subsidiary companies. Defendants are Hugh J. Robertson; Edward T. Murphy; Co-operative Rendering Co.; and Eagan Co. It was found that Robertson "entirely disregarded his duty as president and director of the Eastern Oil Co., that as an employee of the parent company and manager of its rendering department "he was likewise unfaithful" and that by concerted action, in combination with Murphy, he "caused to be advanced and paid by the Eastern Oil Co. to the Co-operative, various sums of money which in the aggregate exceeded the aggregate value of the materials delivered by the Co-operative. I find the amount of this excess to be $30,887.32. No part of this money has ever been repaid."

Chemical Division To Issue Domestic Trade Bulletin

Chemical Division, Department of Commerce, announces that it will issue a trade information bulletin as a phase of its domestic commerce program. It will show by commodities, production statistics, number of establishments, import and export statistics, for about 300 industrial chemicals.

Calco Chemical Co., Inc., files Delaware charter with capital of 10,000 shares no par. This is believed to be the subsidiary company formed by American Cyanamid Co. to take over present activities of the Calco Chemical Co., its recently purchased subsidiary.

Dr. Neil E. Gordon, professor of chemistry, University of Maryland, and editor, "Journal of Chemical Education," is appointed to fill the new chair of chemical education at Johns Hopkins University, for which provision has been made by Francis P. Garvan.

German Maxillianshutt Mining Co., which owns the Mont Cenis process for nitrogen fixation, is negotiating with Royal Dutch Shell group for the sale of this patent. The latter intends to establish a nitrogen plant in Holland.

Spencer Kellogg & Sons, Inc., declares three regular quarterly dividends of 40 cents each on the common, payable March 31, June 30 and September 30 to stock of record March 15, June 15 and September 14 respectively.

Alox Chemical Corp., New York, increases capital from 11,500 to 13,500 shares, of which 1,500 are preferred, $100 each, and 12,000 common, no par.

Nichols Copper Co. declared a dividend of $1.50 on the Class B stock, of which 75 cents is payable May 1 and 75 cents payable November 1, both to stock of record February 1.

Celluloid Corp. declared the regular quarterly dividends of $1.75 on preferred and first preferred participating stock, payable March 1 to stock of record February 10.

United Chemical & Metallurgical Works, Czechoslovakia, is planning extensions for production of artificial fertilizers and rayon.

Union Carbide & Carbon Corp. declares regular quarterly dividend of $1.50, payable April 1 to stock of record March 1.

Curtis & Tompkins, consulting chemists, San Francisco, celebrates its fiftieth anniversary.

Air Reduction Co. acquires Louisiana Oxygen Co.

Dr. Herbert Dow Honored at Annual Chemists' Club Dinner

Chemists' Club, New York, holds annual dinner, February 27, in honor of Dr. Herbert H. Dow, president, Dow Chemical Co. Dr. Theodore B. Wagner, president of the club, acted as toastmaster and speakers included Dr. Charles L. Reese, E. I. duPont de Nemours, Inc., who had the subject "Herbert Dow, Chemist and Chemical Engineer; Edwin M. Allen, president, Mathieson Alkali Works, "Herbert Dow, Industrialist;" and James T. Pardee, vice-president, Dow Chemical Co., on "Herbert Dow, the Man." The dinner was a testimonial to the place Dr. Dow holds in the Chemical industry and was the fourth held by the society, the three held in previous years being in honor of Dr. William H. Nichols, Dr. Leo Baekeland, and Dr. Edgar Fahs Smith.

Herbert H. Dow, president and general manager, Dow Chemical Co., was born in Belleville, Ontario, Canada, February 26, 1866. He was graduated from the Case School of Applied Science in 1888 and for a year served as professor of chemistry, Huron St. Hospital College, Cleveland. Since 1889 he has been associated with the Midland Chemical Co., the Dow Process Co., and the Dow Chemical Co., as manufacturing chemist, partner, or officer. He has taken out over 100 patents and in 1924 received the honorary degree of D. Eng. from the Case School. He is a former member of the Advisory Committee, Council of National Defense, and member of American Institute of Chemical Engineers, American Chemical Society, American Electrochemical Society, Society of Chemical Industry, American Association Advancement of Science, Phi Kappa Psi, Sigma Xi, the Masons. His clubs include Detroit Athletic, Union League of Detroit, and Chemists' of New York.

Union Sulphur Leases New Mine

Union Sulphur Co. leases 1,840 acres on Chocahoula salt dome, five miles from Thiobodaux, La Fourche parish, Louisiana, for a consideration involving a $100,000 cash payment, $800,000 at the expiration of nine months, and a royalty of $1.10 per long ton on all sulfur produced. Lessee must be producing sulfur within two years.

Anglo-Chilean Consolidated Nitrate Corp. will join in the centralized sales plan of nitrate producers as of July 1, according to reports from London.

Charles D. Stranahan, for past ten years American agent for Tharsis Sulphur & Copper Co., Glasgow, dies in Paterson, N. J., February 18, aged 70.

Hooker Electrochemical Co. holds formal opening and inspection of its new Tacoma plant on February 16 at Tacoma, Wash.

Union Carbide & Carbon Co. acquires compressed Gas Corp., Denver, through exchange of stock.

Midwest Dye Products, New York, increases capital from $5,000 to $50,000.

Nitrogen Engineering Corp., New York, increases capital from 1,000 to 10,000 shares no par.

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Chlorate Soda
Phosphorous Compounds

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Chlorate Potash
Persulphate Ammonia

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District Court of Pennsylvania Announces Two Patent Decisions

In case of Monsanto Chemical Co. vs. A. O. Jaeger et al, the United States District Court, Western District of Pennsylvania, holds that the former is entitled only to licenses under patent No. 1,657,754 and applications on such related product inventions as were in existence when contract was signed. The Court further held that inventions made after Dr. Jaeger left Monsanto, in no way belonged to the company, and therefore rights under patents No. 1,675,308 and No. 1,675,309 were refused to the company.

In suit of the Barrett Co. vs. the Selden Co., over Patent No. 1, 604,739, on an "Apparatus for Promoting Catalytic Reaction," granted Oct. 26, 1926, to Charles R. Downs, the District Court, Western District of Pennsylvania, finds the plaintiff's patent to be valid and infringed and sustains all thirty-one claims of the plaintiff. Court held that "the evidence shows that the defendant's converter in use at the institution of this action is exactly covered by the claims of the Downs patent."

Lautaro Nitrate Co. Plans To Expand Holdings In Chile

Lautaro Nitrate Co. proposes to increase ordinary share capital from £6,560,000 to £8,00,000. The local board in Valparaiso has acquired for the company 102 estacas of nitrate grounds of 1,000,000 square meters each, estimated to contain about 100, 000,000 quintals of nitrate of soda. By construction of new plant with modern equipment, company hopes to reduce average cost of production sufficient to justify both increase in capital and plant extensions.

Wesson Oil & Snowdrift Co., Inc., declares a 100 per cent. stock dividend, payable before April 1 to stock of record February 28, thereby increasing capital shares to 600,000. It will redeem on June 1, all $7 cumulative preferred at $110 per share. To provide for this redemption and provide working capital, the company is offering at $72.50 per share a new issue of 400,000 shares no par $4 dividend convertible preferred stock. New preferred is convertible after April 1, share for share into common stock and is redeemable at $85 per share.

Associated Rayon Corp. declares an initial quarterly dividend of $1.50 on 6% cumulative convertible preferred, payable March 1 to stock of record February 21. The new corporation, which started business with approximately $60,000,000 in assets, is controlled by Vereinigte Glanzstoff-Fabriken, Aktiengesellschaft, the leading producer of rayon in Germany. This company has unconditionally guaranteed payment of dividends on Associated Rayon convertible preferred for four years ended December 1, 1932.

Report of American Can Co. for year ended December 31, 1928, shows net income of $19,863,326 after depreciation, interest and federal taxes, equivalent after 7% preferred dividends, to $6.86 a share (par $25) earned on 2,473,998 shares of common stock. This compares with $13,055,199 or $4.11 a share in 1927.

Federal Trade Commission defines "rayon" as meaning and properly designating the artificial silk products, the basis and chief ingredient of which is cellulose.

American Leather Chemists' Association will hold twenty-sixth annual meeting at Chateau Frontenac, Quebec, June 5, 6 and 7.

U. S. Bureau of Mines is conducting tests in Winkler County, Texas, in search of potash deposits which may be developed economically.

Barium Chloride Cost Hearing Held March 5

Public hearings in cost-of-production investigation of barium chloride being conducted by the United States Tariff Commission are held March 5. Present duty on barium chloride is 1½ cents per pound, and application for increase, under section 315, tariff act of 1922, was made May 28, 1928, by Grasselli Chemical Co. Investigation by the Tariff Commission was instituted July 20, 1928.

According to a preliminary statement issued by the Commission, "comparison of the costs of production of barium chloride" in the United States and the c. i. f. values in New York as compiled from invoices of material imported either from Germany or Belgium, including transportation charges from domestic plants either on actual shipments or total domestic production to New York, and including interest on investment on domestic costs, but excluding selling expenses, indicates there is a difference in costs of production of more than 1⅞ cents per pound, the maximum duty permissable under section 315.

Domestic production of barium chloride was begun in 1925 under stress of the war and reached its greatest volume in 1918. Present production is said to be largely in the hands of the Grasselli Chemical Co., with a plant in Grasselli, N. J., and E. I. du Pont de Nemours & Co., with a plant in Philadelphia, while the Chicago Copper & Chemical Co. has a small output from its plant at Blue Island, Ill. Domestic output is given as 7,718,000 pounds in 1924; 7,923,000 pounds in 1925, and 9,184,000 pounds in 1926. Figures for 1927 are not given as they would disclose individual activities.

Imports of barium chloride averaged 3,500,000 pounds per year before the war. Import figures for recent years are:—4,660,650 pounds in 1924; 4,334,120 pounds in 1925; 3,546,758 pounds in 1926; 3,154,853 pounds in 1927, and 2,223,128 pounds during the first eleven months of 1928. The percentage of apparent United States consumption supplied by imports was 49.2 per cent. in 1922; 27.8 per cent. in 1923; 37.6 per cent. in 1924; 35.3 per cent. in 1925; 27.9 per cent. in 1926. There are three large producers in Germany and two in Belgium. In 1925 and 1926 Germany was the principal source of imports of barium chloride; in 1927 Germany supplied 43 per cent. and Belgium 42 per cent., and during the first eleven months of 1928 Germany supplied 15 per cent. and Belgium 85 per cent. of imports.

Offering of $12,500,000 5 G cumulative preferred stock, par value $100, of Proctor & Gamble Co. is made at par and accrued dividends from February 1 by First Investment & Securities Corp., Cincinnati, the National City Co., Bankers Co. of New York, Guaranty Co. of New York, W. E. Hutton & Co. and Hayden, Miller & Co. Proceeds will be used to reimburse treasury for redemption of outstanding 6% cumulative preferred stock at 110 and accrued dividends, to provide funds for new plant at Baltimore and for other coprorate purposes. Company also declares regular quarterly dividend of $1.50 on the 6% preferred, payable March 15, and calls for redemption March 28 at 110.25 $3,160,100 6% preferred.

Celotex Co. declares the regular quarterly dividends of 75 cents on common and $1.75 on preferred, both payable April 1, to stock of record March 15. Celotex Co. common stockholders of record March 6 will be issued warrants entitling them to subscribe to additional stock at $65 in ratio of one share for every seven held. A block of 24,400 unissued shares has been authorized for sale for this purpose. Proceeds will be used in enlarging company's plant facilities. Of an authorized 500,000 shares of common stock, there are now 170,706 outstanding.

Paraffine Companies declares the regular quarterly dividend of $1, payable March 27 to stock of record March 17.

Dyeing Furs and Buttons

Part of the Eastman Pyro Plant

Pyrogallic Acid or Pyro, for short, has long been used to develop color on buttons and to dye furs. Eastman Kodak Company is one of the largest manufacturers of this chemical, since it has extensive use as a photographic chemical. Eastman Pyro is a beautiful white C. P. product. Yet it is priced on a competitive basis. Let us quote on your requirements and submit a sample.

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Magnesium Carbonate

Magnesium Oxide

Quinine Bisulphate

The Financial Markets

United Chemicals, Inc., Acquires 51 Per Cent of Westvaco Stock

New Chemical Holding Company Formed — Offers 20,000 Shares of Preferred Stock in Public Financing — After Acquiring Westvaco, Treasury is said to have nearly $5,000,000 to Purchase Other Plants.

United Chemicals, Inc., is incorporated in Delaware as a holding company to acquire 51 per cent. of the stock of Westvaco Chlorine Products Corp. Public offering of 120,000 shares of participating preferred $3 stock of United Chemical was made at $54 per share to provide funds for this purchase, leaving in the treasury nearly $5,000,000 to be used to buy other chemical plants.

According to the statement issued by the company in connection with this financing, the corporation will receive from the sale and exchange of its securities $6,000,000 in cash and 102,000 shares of common stock of Westvaco Chlorine Products Corp., and will purchase $1,156,800 (51%) of the preferred stock of Westvaco Chlorine Products Corp., at $100 per share. Upon completion of this financing the corporation will own cash and marketable securities equivalent to more than $120 per share of preferred stock to be presently outstanding.

The corporation will acquire common stock of Westvaco Chlorine Products Corp., at $75 per share all of which is to be obtained in exchange for common stock of United Chemicals, Inc., share for share. This stock has a present market value of about $83.50 per share or a total of approximately $8,500,000. Provision has been made in connection with the acquisition of such stock whereby the holders exchanging such stock for common stock of the corporation shall have the right to withdraw the common stock of Westvaco Chlorine Products Corp., to be acquired by United Chemicals, Inc., as a whole but not in part upon payment therefor in cash of $10,200,000. Should the above option be exercised, the assets of the corporation on the basis of the present financing would approximate $16,200,000 or $135 per share of preferred stock to be presently outstanding.

The board of directors of the Corporation consists of: Matthew C. Brush, president, American International Corporation; H. Hobart Porter, Sanderson & Porter; Clifford B. Ewart, president, Taylor Ewart & Company, Inc.; Edwin A. Potter, Jr., vice-president, Guaranty Trust Co., of New York; William B. Thom. president, Westvaco Chlorine Products Corp. and the Warner Chemical Co.

American Solvents Earn $1.69 a Share

Report of American Solvents & Chemical Corp. and subsidiaries for year ended December 31, 1928, shows net profit of $670,708 after depreciation, interest, and federal taxes, equivalent after allowing for participation provisions of preference stock, to $1.69 a share on 160,000 no-par shares of common stock. This compares with $317,112, or 10 cents a share, on common in 1927.

Balance sheet as of December 31, 1928, shows net current assets were $2,089,945, an increase of $681,145 over 1927. Ratio of current assets to liabilities was 8.2 to 1. Cash and call loans totaled $744,863 and total surplus at close of year amounted to $1,050,841.

Company also declared regular quarterly dividend of 75 cents on the participating preference stock, payable April 1 to stock of record March 12.

Monsanto Declares Stock Dividend; Earns $8.59 a Share

Monsanto Chemical Works declares a stock dividend of 10%, payable April 1 to stock of record March 20. They also declared a regular quarterly cash dividend of 62½ cents a share, also payable April 1 to stockholders of record March 20. Present officers and directors were re-elected. No fractional shares will be issued. Cash will be paid for fractional shares on the basis of the average price on the Chicago Stock Exchange on April 1, 1929.

Monsanto Chemical Works reports for year ended December 31, 1928, net profit of $944,438 after depreciation, interest, federal taxes, etc., equivalent to $8.59 a share earned on 110,000 no par shares of capital stock. This compares with $672,622, or $6.11 a share, in 1927. In addition company's British subsidiary, Graesser-Monsanto Chemical Works, Ltd., earned net profit after taxes of £10,978 in 1928.

Balance sheet of Monsanto Chemical Works as of December 31, 1928 (giving effect to increased capitalization), shows total assets of $11,654,955, and surplus of $2,775,252, while current assets amounted to $2,781,440 and current liabilities $538,694. Capital stock valued at $4,186,800 is represented by 125,604 no-par shares.

Three Hundred Per Cent Stock Dividend by Mathieson

Mathieson Alkali Works, Inc., declares a stock dividend of three shares for one and authorized an increase in the no-par common stock to 1,000,000 shares from 200,000 shares. Company also declared regular quarterly dividends of $1.50 on the common and $1.75 on the preferred, both payable April 1 to stock of record March 15. The stock dividend payable date is to be fixed later.

Mathieson Alkali Works, Inc., for year ended December 31, 1928, reports net income of $2,091,402 after depreciation, depletion and federal taxes, equivalent after dividend requirements on 7% preferred stock, to $13.04 a share earned on 147,082 shares of no-par common stock. This compares with $1,832,916 or $11.27 a share on 147,207 shares of common in 1927.

Dividends paid during the year totaled $1,055,967. Profit and loss surplus is reported at $6,380,005, which compares with $5,399,979 at the end of the previous year. Current assets are reported at $3,592,186 against current liabilities of $1,012,129.

Report of Air Reduction Co., Inc., for year ended December 31, 1928, shows net profit of $3,208,993 after federal taxes, depreciation reserve and bonuses to officers and employes, etc., equivalent to $4.60 a share earned on 696,793 shares of no-par stock. This compares with $2,412,596 or $10.74 a share on 224,597 shares in 1927.

Profit for quarter ended December 31, 1928, as $1,378,896 after depreciation, but before federal taxes, comparing with profit of $924,931 in preceding quarter and $823,039 in fourth quarter of previous year.

Commercial Solvents Corp. declared a stock dividend of 2% and the regular quarterly dividend of $2, both payable April 1, to stock of record March 15.

Newport Co., Passaic, declares initial quarterly dividend of 75 cents on "A" common stock, payable March 1 to holders of record February 25.

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BUFFALO — REFINERS OF METHANOL — NEW YORK

American Commercial Alcohol Nets $6.96 a Share in First Report

First annual report of American Commercial Alcohol Corp., is issued covering eight months from April 25 to December 31, 1928, and shows net profit of $710,861 after depreciation, interest, federal taxes, etc., equivalent after allowing for eight months dividend requirements on 7% preferred stock, to $6.96 a share earned on 87,382 no-par shares of common stock.

Income account for eight months ended December 31, 1928, follows: Operating and other income $1,635,830; expenses, etc., $513,102; operating profit $1,122,728; depreciation $100,688; interest, discount, etc., $209,446; federal taxes $101,733; net profit $710,861; preferred dividends including dividend payable February 1, 1929, $118,067; surplus $592,794. Balance sheet as of Dec. 31, last, shows current assets of $3,349,304 and current liabilities of $984,167. Cash amounted to $446,324.

Stockholders have authorized an increase in capital stock from 150,000 to 300,000 shares. Additional stock will be available for the acquisition of certain additional properties understood to be under consideration at the present time.

American Commercial Alcohol Corp., calls for redemption on April 1 at 103 all its outstanding fifteen-year mortgage six per cent. bonds. The bonds will be payable at the National City Bank. The company has purchased $1,300,000 of the bonds.

Westvaco Chlorine Reports Net for 1928 of $3.60 a Share

Consolidated earnings of the Westvaco Chlorine Products Corp. and subsidiaries for the year ended Dec. 31, 1928, were $719,368 after all charges, Federal taxes, interest, bond amortization and dividends on preferred stocks, equivalent to $3.60 a share earned on 200,000 common shares. Sales for the year were $5,215,866. Current assets as of Dec. 31, 1928, were $1,500,785, compared with current liabilities of $192,052.

Westvaco Chlorine Products Corp., declares an initial dividend of fifty cents a share on the common stock, payable April 1, to stockholders of record March 20.

United States Gypsum Co. reports for year ended December 31, 1928, net income of $6,031,635 after depreciation, depletion, federal taxes, etc., equivalent after 7% preferred dividends to $7.22 a share (par $20) earned on 760,436 shares of common stock. This compares with $7,538,508 or $10.10 a share on 691,198 shares in 1927.

Report of Industrial Rayon Corp. for year ended December 31, 1928, shows net profit of $1,653,601 after depreciation, interest and federal taxes, equivalent to $9.25 a share earned on 178,623 shares of stock. This compares with net profit of $907,768 in 1927 or $5.08 a share figured on above share basis.

Will & Baumer Candle Co., Inc., declared a dividend of 10 cents on the common, payable February 15 to stock of record February 1. Previously dividends were 25 cents quarterly on the common. The regular quarterly dividend of $2 was declared on the preferred, payable April 1 to stock of record March 15.

Hercules Powder Co. declares a quarterly dividend of 75 cents on the new common, recently split four-for-one, placing stock on $3 annual basis, equivalent to $12, against $8 previously. Dividend is payable March 25 to stock of record March 14.

Stockholders of United Piece Dye Works vote in favor of increasing authorized no-par common stock to 900,000 shares, from 450,000. An additional share of common will be issued to each holder of common stock of record March 6.

Tennessee Copper & Chemical Corp. declared regular quarterly dividend of 25 cents, payable March 15 to stock of record February 28.

J. T. Baker Makes Public Offer Of 10,000 Shares of Common Stock

J. T. Baker Chemical Co., Phillipsburg, N. J., makes public offering of 10,000 shares of common stock at $12.50 per share, to yield six per cent. Offer did not represent new financing.

Company was organized in 1904 as a New Jersey corporation and has been chiefly engaged in the manufacture and sale of chemicals used for analytical purposes in industrial and educational laboratories. It also manufactures a large variety of chemicals for pharmaceutical and industrial uses. Company recently purchased business of the Dissosway Chemical Co., Brooklyn, and that of the Taylor Chemical Corp., Cascade Mills, N. Y. Its factory property at Phillipsburg comprises 10 acres.

Sales are reported as follows:—1928, $2,223,673; 1927, $1,865,027; 1926, $1,430,064; 1925, $1,254,546; 1920, $744,333; 1915, $457,181; 1910, $117,620; 1905, $33,614. Net earnings, before preferred dividends, were $197,894 in 1928, $148,948 in 1927, $118,924 in 1926, $88,025 in 1925. Authorized capitalization of the company consists of 5,000 shares of $100 7-per cent. first preferred (4,143 shares outstanding), 5,000 shares of $100 7-per cent. second preferred (3,500 shares outstanding) and 200,000 shares of no-par common stock (100,000 shares outstanding). Condensed balance sheet at December 31, 1928, showed current assets of $1,119,019 and total assets of $1,700,000 current liabilities of $457,644, and surplus of $328,618.

Du Pont Places New Common On $4 Basis Equal to $14 on Old

E. I. du Pont de Nemours & Co. declares an initial quarterly dividend of $1 on the new $20 par common, placing the stock on $4 annual basis. This is equivalent to $14 on the old no-par stock, recently split 3½ for one, which was on $10 regular annual basis. The regular quarterly dividend of $1.50 on the debenture stock was also declared, payable April 25 to stock of record April 10. The common dividend is payable March 15 to stock of record March 1.

On December 16, last, du Pont stockholders voted to change authorized common stock to 15,000,000 shares of $20 par value from 5,000,000 shares of no par. Following this action directors split the stock on the basis of 3½ shares of $20 par for each share of no-par stock. Previous to the split-up the common stock was paying $2.50 quarterly dividends, extras being paid from time to time, The last extra was $4.47 paid January 5, 1929.

Report of Celanese Corp. of America for year ended December 31, 1928, shows net profit of $2,356,976 after depreciation, federal taxes, inventory adjustment, etc., comparing with $2,754,071 in 1927. Stock outstanding consists of 114,818 shares (par $100) of 7% cumulative series prior preferred, 148,179 shares (par $100) 7% cumulative first participating preferred and 1,000,000 no-par shares of common.

Johns-Manville Corp. and subsidiary companies, manufacturers of asbestos and magnesia products, report for year ended December 31, 1928, net profit of $5,589,393 after depreciation, federal taxes, etc., equivalent after dividend requirements on 7% preferred stock, to $6.75 a share earned on 750,000 no-par shares of common stock. This compares with $4,108,159 or $4.77 a share in 1927.

Celotex Co. reports for fiscal year ended October 31, last, net income totaled $1,380,622 after all charges, including taxes and depreciation, or quale to $6.55 a share on 154,635 shares of no-par common outstanding. This compared with $817,057 or $3.31 a share in the preceding year.

International Salt Co. and subsidiaries report for six months ended December 31, 1928 profit of $344,477 after expenses, fixed charges and sinking fund but before federal taxes, against $118,456 in corresponding period of 1927.

The Industry's Stocks

1929 Feb. 28 Bid	1929 Feb. 28 Asked	1929 High	1929 Low	1928 High	1928 Low	Sales In Feb.	Sales Since Jan. 1	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1928	Earnings $-per share-$ 1927
								NEW YORK STOCK EXCHANGE					
111⅜	108	114⅜	96⅞	99⅛	59	53,100	153,900	Air Reduction	No	683,873	$2.00	9 mo. 3.70	10.74
305	301½	305	241	252½	146	69,600	170,300	Allied Chem. & Dye	No	2,178,109	6.00		10.03
122½	122⅜	123	121			1,000	3,900	7% pfd	100	392,849	7%		62.59
19	18½	23⅜	18½	26	15⅛	16,700	60,300	Am. Agricultural Chem	100	333,221	...		1.59
64	63	73⅛	61½	79⅞	55⅜	18,400	36,300	pfd	100	284,552	...		7.86
121	119⅜	121	107½	117½	70½	1,066,900	1,129,300	American Can	25	2,473,998	3.00		4.11
.....	.....	.....	.....	147	136½	4,300	5,600	pfd	100	412,333	7%		31.66
73½	71	81⅛	60½	63⅜	39	181,400	880,000	American Metal, Ltd	No	595,114	*3.00	9 mo. 2.30	3.64
125	120	135	137	117½	109	7,900	14,700	pfd	100	99,907	6%	9 mo. 18.92	50.27
123	119½	122½	93½	293	169	484,400	869,000	American Smelt. & Refin	100	609,980	4.00	6 mo. 10.61	19.64
135⅜	135⅝	138	135½	142	131	3,000	5,700	pfd	100	500,000	7%	6 mo. 16.44	30.96
44½	42½	44⅞	35⅛	57	6⅜	41,500	75,000	Amer. Zinc & Lead	25	193,120	...		...
104⅞	104½	108	101	117½	40	5,700	10,200	pfd	25	96,560	...		d2.72
148⅛	142½	148⅛	115½	120½	53¼	2,393,500	4,522,400	Anaconda Copper Mining	50	3,302,817	6.00		3.37
94⅛	94	110⅛	91⅛	112⅛	55½	25,800	78,100	Archer Dan. Mid	No	213,712	4.00	7.34	5.77
114	114	115	114			100	480	pfd	100	43,000	7%	46.94	37.39
108	104	115	99½	114	63	19,100	39,400	Atlas Powder Co	No	261,438	4.00	6.30	5.75
104	103½	106½	103	110½	102	880	1,320	pfd	100	90,000	6%	6 mo. 10.83	22.71
57⅛	56½	68	53½	66½	50	1,015,500	643,400	Atlantic Refining	25	500,000	1.00	9 mo. 21.72	1.83
9⅛	8⅛	9½	7⅛	12½	4½	52,900	90,200	Butte Copper & Zinc	5	600,000	...		0.10
10½	9⅛	12⅛	9	16⅛	8¾	17,400	58,600	Butte Superior Mng	10	290,198	2.00	9 mo. 0.16	0.94
124	122½	129⅛	106	122	65	21,400	58,300	By Product Coke	No	189,936	*5.00	9 mo. 5.78	5.68
3⅛	3⅜	4	3	5⅛	1½	34,300	98,000	Calla Lead & Zinc	10	724,592	...	9 mo. ...	0.10
60½	58⅛	60⅜	44	47⅛	20½	429,200	900,500	Calumet & Hecla	25	2,005,502	2.50	9 mo. 0.95	0.29
22½	22	28⅛	20⅜	119	61½	17,900	41,000	Certainteed Prod	No	400,000	...	9 mo. ...	5.31
65⅛	60	81½	60	63½	23½	500	2,200	7% pfd	100	62,904	7%	9 mo. 0.87	56.80
107½	101⅛	107½	71⅜	74⅛	37⅜	172,300	1,159,100	Chile Copper	25	4,415,497	3.00	6 mo. 1.96	2.51
146	143	154⅛	124	134½	79	67,500	120,400	Columb Carbon	No	402,131	...	9 mo. 5.24	4.83
274	268	274	225½	250½	137½	57,100	81,700	Commercial Solvents	No	217,722	8.00	13.19	9.25
74⅜	73½	74⅜	60	64½	53	316,300	499,400	Cont. Can	No	1,420,000	5.00		7.21
126	12⁰⁰	126	124¼	128	123	60	200	pfd	100	51,125	7%		86.82
85⅜	85½	91⅞	83	94	64⅜	71,800	144,100	Corn Products	25	2,530,000	2.00	9 mo. 3.00	3.50
141⅜	141½	144½	141⅜	146½	138½	1,100	2,700	pfd	100	250,000	7%	9 mo. 35.63	42.40
63⅜	61⅜	69⅛	58⅛	68½	34⅜	218,300	427,100	Davison Chem	No	480,000	...		6.21
59⅛	58⅜	64⅛	55½	61	40	43,000	60,100	Devoe & Rayn A	No	110,000	2.40	6 mo. †5.95	†5.03
115	115	115½	112	120	108	230	500	1st pfd	100	17,473	7%	6 mo. 34.71	53.23
117⅜	117½	118⅛	115⅜	121½	114	4,100	6,300	Dupont deb	100	904,539	6%	9 mo. 57.79	57.03
189½	186⅛	198½	155⅜	503	310	149,700	157,000	Dupont de Nemours	No	2,661,658	*14.75	20.89	15.45
184⅛	184⅞	194½	181	194½	163	39,100	58,000	Eastman Kodak	No	2,057,560	*8.00		9.61
127½	126	127½	126	132¼	123½	190	280	pfd	100	61,657	6%		326.68
301	301	310	234	230	120	2,600	4,400	Fed. Mining & Smelting	100	50,400	...		23.36
74⅛	73½	84⅜	72	89⅛	65	155,800	289,300	Fleischmann	No	4,500,000	*5.00	9 mo. 3.24	4.30
48⅛	47⅜	54⅛	45½	109½	43	60,800	247,400	Freeport Texas	No	729,844	4.00	4.49	5.12
71⅛	70⅜	81½	66⅜	94¼	141½	35,300	91,100	General Asphalt	100	206,887	...	6 mo. ...	4.74
114	114	120½	108⅞	150	132	3,700	7,100	pfd	100	68,742	5%	6 mo. d5.09	19.34
43⅞	42½	44½	36⅞	37	20⅜	99,700	306,800	Glidden Com	No	500,000	*2.00	3.37	2.88
104⅜	104⅜	105	103½	105	95	890	2,260	prior pfd	100	69,167	7%	32.69	23.91
72½	71	82	66⅜	143¼	71	565,700	1,576,400	Gold Dust	No		2.50		8.97
74	74	79½	71	84	64½	10,100	28,300	Household Prod	No	575,000	*4.00	6 mo. 2.64	5.22
14⅜	14⅜	17⅛	14⅜	20⅞	13	13,400	34,000	Intern. Agri	No	450,000			1.34
84⅛	81	88½	79½	85	48⅜	2,200	7,000	pfd	100	100,000	7%		13.03
64⅜	62½	72⅜	46½	46	41⅛	2,099,400	4,206,800	Intern. Nickel	No	1,673,384	3.00	9 mo. 4.72	3.30
57½	57⅛	63	56½	60	47⅛	12,100	33,000	Int. Print Ink	No	256,022	2.50	6 mo. 2.58	4.98
82⅛	79½	90	55½	69	49½	5,900	9,700	Intern. Salt	100	60,771	...	6 mo. 0.05	5.38
121½	121½	121½	119	202	96½	369,000	783,300	Johns-Mansville	No	750,000	3.00	9 mo. 4.94	4.78
87⅛	85	113⅞	79	124½	63⅜	61,400	120,900	Liquid Carbonic Corp	No	125,000	4.00	7.05	5.90
43½	43	46	40⅜	57¼	45	5,300	11,700	Mac and Forbes	No	378,500	*3.50	9 mo. 2.34	3.62
210	200½	218	175	190	117½	7,100	14,300	Mathieson Alk	No	147,207	6.00	9 mo. 9.54	10.93
123	123	125	120	130	115	460	740	pfd	100	24,750	7%	9 mo. 63.03	74.06
44⅜	42⅜	44⅛	30⅛	33	17⅜	239,300	424,100	Miami Copper	5	747,116	2.00		1.53
42½	41½	43½	35	58½	29½	40,500	80,600	National Dist. Prod	No	168,000	...		...
				71⅜	51½			pfd	No	107,720	...		0.55
82⅛	82⅛	84⅞	67⅛	....	....	12,600	30,300	pfd. tem. ctfs	...	...	...		...
151½	150	158½	132	136	115	11,800	69,600	National Lead	100	309,831	5%		8.90
55⅜	54	55⅜	38	41½	22⅜	90,500	154,400	Penick & Ford	No	433,773	...	9 mo. 1.32	1.76
272½	272¼	272¼	208	217	157	27,200	41,100	Peoples Gas Chi	100	511,521	8%	9 mo. 8.98	10.81
81¼	77	94	62	71½	37	407,400	938,400	St Joseph Lead	10	1,950,509	*3.00		2.06
49½	49	55½	48	59⅜	37¾	422,300	809,300	Standard Oil Co. of N. J	25	24,419,219	*1.50		1.52
40⅜	39⅞	45⅜	38⅜	45½	28⅛	406,500	1,706,100	Standard Oil Co. of N. Y	25	17,118,931	1.60		0.67
19¼	19½	20⅜	17½	19⅞	10½	203,700	307,000	Tenn. Cop. & Chem	No	794,626	1.00		0.51
77¼	75½	82	72¼	82½	62¼	314,600	742,000	Texas Gulf Sulfur	No	2,540,000	4.00	5.72	4.76
216½	212	227⅜	196½	209	186½	397,600	775,100	Union Carbide	No	2,742,072	6.00	9 mo. 7.16	9.53
148½	145½	154⅛	128	138	102½	182,000	322,700	U. S. Ind. Alc	No	240,000	6.00	6 mo. 3.90	7.26
125½	124⅜	125⅞	124¼	125⅞	118⅜	380	660	pfd	100	60,000	7%	6 mo. 19.12	36.03
110½	107½	116½	95⅜	111¼	60	352,600	632,500	Vanadium Corp	No	376,637	*4.00	6 mo. 2.57	4.97
20	19⅛	24⅛	18¼	20⅜	12	72,100	287,700	Virginia Car. com	No	486,700	...	0.69	...
57⅜	57	65½	57	64¼	44⅜	20,600	50,200	6% pfd	100	213,392	...	7.57	d5.41
95	93½	97½	94⅛	99½	88½	1,100	3,600	7% pfd	100	125,000	7%	20.09	d1.70
High	**Low**							NEW YORK CURB					
.....	.....	23	17⅛	31½	16½	500	5,500	Acetol Prod	No	60,000	2.40		8.69
37	37	43¼	36	42⅜	33½	2,900	8,600	Agfa Ansco	No	300,000	...		
175	173¼	189	146	197½	120	6,400	16,100	Aluminum Co. of America	No	1,472,625	...		3.28
.....	.....	106½	103½	110½	104	3,200	4,200	pfd	100	1,472,625	6%		9.28
85	83	87	78	87½	74	13,500	25,700	Amer. Com. Alc	No	77,000	...	3 mo. 2.66	...
66⅜	64½	80	50⅜	65	30⅜	80,000	230,500	Amer. Cyan	20	428,465	8%	†3.67	†2.92
.....	.....	.....	.....	24	13		14,800	Amer. Rayon Prod	No	123,500	...	15 mo. ...	
38⅜	38½	40⅜	26½	28½	11⅜	40,200	82,900	Amer. Sol. & Chem. com	No	160,000	...	1.58	0.07
50½	50½	55⅛	46⅜	47⅞	25½	13,800	43,000	pfd	No	100,000	...	6.52	3.17
42	41½	45½	33	54	26½	9,000	38,200	Anglo Chile Nitrate	No	1,756,750	...	6 mo.. ...	...
6	5½	8⅛	4⅜	33½	7	15,900	27,800	Br. Celanese	No	2,650,000	...	0.55	...
42	42	43	40	46½	41	200	300	Canad. Ind. Alc	No	1,092,915	1.52	†2.87	†2.49
.....	.....	267	180	226	156	2,300	2,700	Casein Co	100	21,196	*9%		7.98
53½	52	57⅛	41⅛	103	36⅛	24,300	32,200	Celanese Corp. of Am	No	1,000,000	...		1.72
.....	.....	50	41	122	34	800	2,100	Celluloid Co	No	194,952	...		0.87
.....	.....	101	100	132	103½	500	1,100	1st pfd	No	23,882	7.00		11.94
.....	.....	80	80	97½	75		100	7% pfd	No	24,551	7.00		9.96
.....	.....	.....	.....	73¾	49		2,360	Celotex pfd	100	52,532	7%	26.28	15.55
.....	.....	80¾	73	92	75	7,600	13,500	Colgate-Palmolive Peet			2.00		
.....	.....	.....	.....	....	....			Courtaulds	£1	12,000,000	22½%		26.55%
.....	.....	25½	20⅛	24⅛	20	8,900	14,200	Am. dep-rects	...	...	...		...

1929 Feb. 28 High	1929 Feb. 28 Low	1929 High	1929 Low	1928 High	1928 Low	Sales In Feb.	Sales Since Jan. 1	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1928	Earnings $-per share-$ 1927
...	.....	130	96¾	380	192	1,300	1,350	Hercules Powder	No	147,000	14%	22.04	16.36
...	.....	121¼	115	125	118½	150	380	pfd	100	114,241	7%	9 mo. 24.69	28.05
23½	21½	24¼	19½	23	7½	900	3,600	Heyden Chem.	10	150,000	...		1.02
...	.....	27	23	98	38½	600	1,000	Monroe Chem.					
127	118	.....	.....	....	....		100	Monsanto Chem.	No	110,000	2.50	9 mo. 6.30	6.11
...	.....	.....	.....	....	....		349	Penn Salt	50	150,000	5.00	8.27	8.09
8	8	9½	7¾	9¾	6½	5,500	17,700	Pyrene Mfg.	10	219,470	.80		0.70
37½	35	43½	31½	....	....	44,200	44,200	Royal Baking, new com	100	800,000	1.00	6 mo. 0.53	1.14
				111½	103			pfd	100	100,000	6%	6 mo. 7.26	15.11
...	.....	88¾	85	92	65½	625	710	Sherwin Williams	20	594,445	4.00	6.99	6.42
27¾	27¼	28¾	23½	29	17	32,000	80,900	Silica Gel	No	600,000	...		
...	.....	.....	.....	9¾	6¼	500	500	Snia Viscosa	120 lire	8,333,333	...		3.01 lire
...	.....	.....	.....	10	5¾		100	dep-recpts	...	...	...		...
...	.....	.....	.....	42	31½	6,700	29,000	Spencer Kellogg	No	500,000	1.60	3.59	2.37
135½	135	139½	132¾	150½	125	5,600	12,300	Swift & Co.	100	1,500,000	8%	9.87	8.13
461	455	550	440½	630	450	1,800	3,900	Tubize "B"	No	78,858	10.00		
62½	62	73	60½	100	53¾	10,000	13,600	U. S. Gypsum	20	691,502	1.60	6 mo. 4.42	10.08
85	83¾	87½	47¼	....	....	61,000	100,000	Westvaco Chlorine Prod.					
								CLEVELAND					
...	.....	147	138	147½	104	435	1,135	Cleve-Cliff Iron	No	400,000	4.00		9.74
...	.....	260	200	225	112½	177	334	Dow Chem.	No	120,000	6.00		
...	.....	.....	.....	107	103¾	46	126	pfd	100	30,000	7%		
...	.....	.....	.....	....	....		20	Glidden	No	500,000	*2.00	3.37	2.88
105	105	105	103¾	104¾	96	245	485	prior pfd	100	69,167	7%	32.69	23.91
...	.....	88	85	95	65½	1,202	2,468	Sherwin Williams	25	594,445	4.00	6.99	6.42
...	.....	108	106	109½	106	605	1,144	pfd	100	125,000	6%	39.21	37.82
28½	28⅜	29	28	28	24¾	150	910	Wood Chemical Prod. "A"	No	20,000	2.00		7.75
								CHICAGO					
...	.....	.....	.....	73	49	1,400	5,050	Celotex	No	154,635	3.00	6.57	3.31
				92	80		[redacted]	pfd	100	52,532	7%	26.28	15.55
128	127	129	104	96	91½	6,500	9,300	Monsanto Chem.	No	110,000	2.50	9 mo. 6.30	6.11
135½	135	140	133½	146	127½	5,400	11,200	Swift & Co.	100	1,500,000	8%	9.87	8.13
25	24½	26¼	23	....	....	900	1,500	U. S. Gypsum	20	691,502	1.60	6 mo. 4.42	10.08
54½	54	55	54	....	....	600	600	United Chemicals, pfd.					
62½	62¼	72½	62¼	100	55	14,800	14,855	Monroe Chem	100	167,500	...		4.74
								CINCINNATI					
...	.....	.....	.....	....	.....		5	Fleishmann pfd	100	12,200	6%	9 mo. 1,197.09	1,589.49
365	357	375	279	300	249	6,300	11,100	Proc. & Gam	20	1,250,000	8.00	11.96	11.38
								PHILADELPHIA					
...	.....	97½	95	109½	92	1,300	2,900	Penn. Salt	50	150,000	5.00	8.27	8.09
186½	182	195½	162¾	173½	114½	264,100	574,200	United Gas Imp.	50	3,903,791	6.00		6.28
								MONTREAL					
17	16	.....	.....	....	....	5,400	14,400	Asbestor Corp	No	200,000	...		0.87
50	49¾	.....	.....	.	....	1,800	3,700	pfd	100	74,564	7%		9.32
44¾	42¾	.....	.....	....	....	3 6,800	71,600	Canada Ind. Alc	No	1,092,915	1.52	†2.87	†2.49
87½	87	.....	.....	...	...	45,000	99,500	Shawinigan W. & P.	No	1,844,700	2.00		2.41
								BALTIMORE					
...	.....	28¾	24	28¾	17	1,030	2,600	Silica Gel	No	600,000	...		
Bid	**Asked**							UNLISTED					
80	82	.....	.....	80	70		...	Agfa Ansco, pfd	100	50,500	...		...
113	120	.....	.....	375	190		...	Hercules Powd., com	No	147,000	14%	9 mo. 15.10	16.36
75	80	.....	.....	82	64		...	Merck. & Co., pfd	100	33,950	...		...
166	166	.....	.....	169	116		...	Newport	1	929,498	...		0.19

*Includes extra dividends. †Class A and class B shares combined. d Deficit.

The Industry's Bonds

1929 Feb. 28 High	1929 Feb. 28 Low	1929 High	1929 Low	1928 High	1928 Low	Sales In Feb.	Sales Since Jan. 1	ISSUE	Date Due	Int. %	Int. Period	Orig. (1) Offering $
								NEW YORK STOCK EXCHANGE				
105½	105	106½	104⅜	106¾	104	118	213	Am. Agri Chem.	1941	7½	F. A.	30,000
96	96	96	93¼	97	92	126	207	Amer. Cyanid	1942	5	A. O.	
100½	100	102	100¼	102¾	99¾	197	388	Am. Smelt & Refin "A" 5%	1947	5	A. O.	...
99¼	99	100	94½	105½	92	288	1,043	Anglo Chilean	1945	7	M. N.	16,500
100⅛	100⅛	102½	100	103¾	99⅞	103	169	Atlantic Refin	1937	5	J. J.	15,000
...	.....	102	100	103½	100	27	55	By product Coke	1945	5½	M. N.	8,000
...	.....	103	99½	103½	100	1	3	Corn Product Refin	1934	5	M. N.	10,000
105	105	109½	103	117	106	23	53	General Asphalt	1939	6	A. O.	5,000
...	.....	93	90¾	95¾	89½	10	18	Int. Agric. Corp	1932	5	M. N.	30,000
80¼	80	81½	79½	86½	77	15	17	Int. Agri. Corp. stamped. extended	1942	5	M. N.	7,020
				205	113			Liq. Carbonic Corp	1941	6	F. A.	5,000
...	.....	127	118	....	...	394	888	Montecatini	1937	7	J. J.	
...	.....	95	93	....	...	158	577	Ex War	1937	7	J. J.	
...	.....	113	112½	....	...		3	People's Gas & Coke	1943	6	A. O.	10,000
105	105	105¼	104½	108½	102	58	120	Refunding	1947	5	M. S.	40,000
102	101¾	103⅜	101¼	104	102	393	724	Standard Oil N. J.	1946	5	F. A.	120,000
110	107½	114	104	120	101½	170	253	Tenn. Cop. and Chem.	1941	6	A. O.	3,000
...	.....	82	81¼	91½	82	30	31	Va. Iron C. & C.	1949	5	M. S.	
								NEW YORK CURB				
100¾	100½	102½	100	103½	100	190	397	Alum. Co. of Am 52	1952	5	M. S.	
129¾	128¾	132	115½	121½	98	215	658	Amer. Com. Alc.	1943	5	M. N.	
119⅛	119	122	114	125	99	308	826	Amer. Solv. & Chem.	1936	6	M. S.	
				101⅞	99¾			Anaconda Cop.	1929	6	J. J.	25,000
99	98⅜	99⅞	98	101⅜	97½	180	499	Koppers Gas and Coke	1947	5	J. D.	25,000
...	.....	.....	.....	103½	98	1	107	Natl. Dist. Prod.	1935	6½	J. D. 15	3,500
93½	93¾	94½	93½	98⅞	93½	204	294	Shawinigan W & P	1967	4½	A. O.	
...	.....	102	101	106⅜	100	6	19	Silica Gel. 6½% with warr.	1952	6½		
...	.....	98	96½	100	95	43	96	Solvay Am. Invest. Corp.	1942	5	M. S.	15,000
100	99⅞	100⅛	98¾	101½	99⅛	198	451	Swift & Co.	1932	5	A. O.	50,000
...	.....	104	102½	104	99½	69	109	Westvaco Chlorine Prod.	1937	5½	M. S.	2,500

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Chemically identical with that interesting mineral malachite, copper carbonate has a truly beautiful appearance -- but -- "handsome is that handsome does" -- and it also plays many valuable chemical roles. Long famous as a green pigment, it has also long been used in electro-plating. For this purpose, copper carbonate of our manufacture, because it analyzes 54% Cu. with less than 1% of water soluble salts, has long been "first choice of wise buyers." The most interesting new development, during the half century we have made this product, is its recent use in treating wheat for smut. This new use as a fungicide has already grown to a point where it dominates all other consuming fields. If you use (or might use) this chemical, our long accumulated experience is at your disposal.

CHARLES COOPER & CO.

192 Worth Street

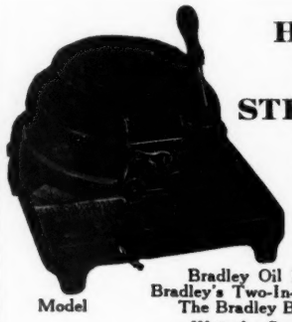
New York, N. Y.

Established 1857

Works Newark, N. J.

New French Company Formed to Exploit Claude Ammonia Process

The Saint-Gobain Co. is one of the largest producers of superphosphates in France, and has also recently become interested in the production of artificial nitrogenous fertilizers. In cooperation with the "Air Liquide" company, it created the "Societe Chimique de la Grande Paroisse" for the exploitation in France of the Claude synthetic ammonia process, which is being actively developed with large profits to the Grande-Paroisse Company. In connection with this new nitrogen industry the Saint-Gobain Co. has installed at its Chauny plant equipment for the production of nitric acid from the ammonia produced by the Claude process. These original installations for the production of nitric acid have recently been doubled, reports Assistant Commercial Attache D. J. Reagan, Paris.



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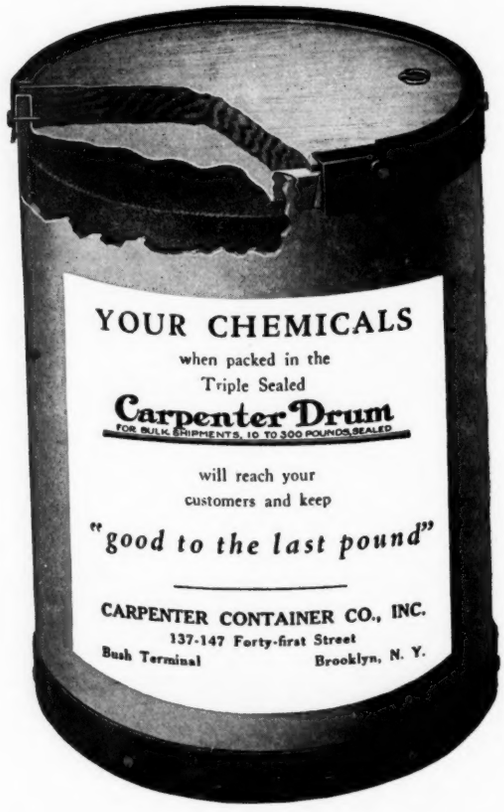


The Trend of Prices

High Level of Industrial Activity Maintained Throughout Month

Reports for February Indicate That A High Level Has Been Maintained Throughout Industry Generally—Trade in Chemicals Exceeds Volume for February of Last Year—Mineral Acids in Heavy Demand—Plants Extended to Capacity on Many Items—Copper Sulfate Rise Phenomenal.

Preliminary reports for February indicate the maintenance of a high level of industrial activities throughout industry generally. Steel plants operated at a high percentage of capacity; the output of coal continued large; manufacturing and mining increased; but declines were noted in the production of petroleum and in building construction.

Wholesale commodity prices rose slightly. Reserve bank credit declined between the middle of January and the middle of February, reflecting chiefly a reduction in reserve balances of member banks.

Production of industries, the board stated, increased in January and continued to be larger than a year ago. The output of pig iron, steel ingots and automobiles was in record volume for January. The high rate of steel activity was found to reflect large purchases from automobile manufacturers and also increased demand from railroads.

Shipments of freight by rail increased during January and the first two weeks of February and were larger than a year ago. The increase reflected primarily larger shipments of coal and coke and livestock.

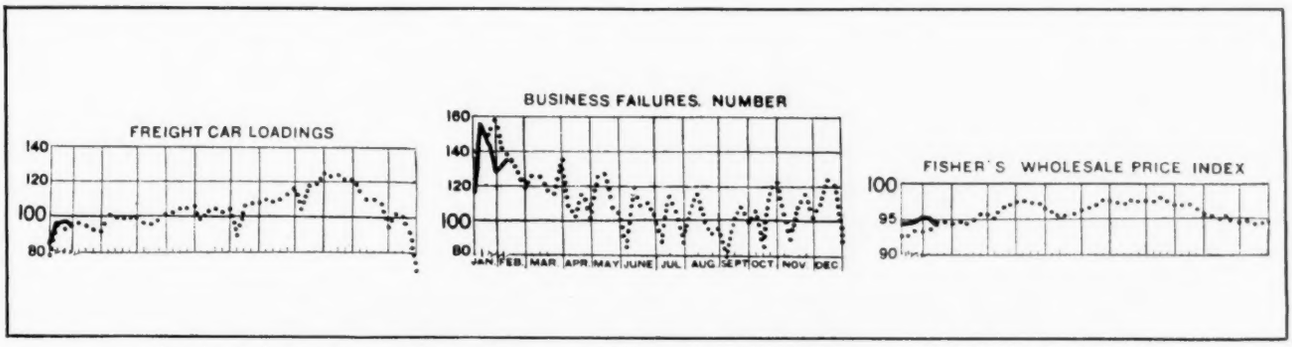
Conditions in the chemical trade during February have closely approximated those which prevailed during the previous month. There is a general feeling that the combined movement of industrial chemicals for the month of February will exceed that of a year ago by a satisfactory margin. The absence of any wide variation in prices has tended to create considerable confidence in the market, and producers report a much broader demand from consumers who are ordinarily in the habit of buying smaller quantities.

As was the case last month, the chief feature of the market again during the past month has been the great number of items which are in relatively short supply. On all of these items producers are rushing plants to capacity in an effort to keep abreast of the demand. In some cases the situation is more serious than in others, but in all, things are rapidly clearing up and soon should be on a normal basis. All the mineral acids, lead by sulfuric, are well sold up, and the latter, especially, is in tight position. Oxalic acid, too, is scarcely available for spot business, as producers have replaced much of the imported tonnage and are banding most of their efforts to shipping material under contracts. Phenol and formaldehyde still continue to be in rather scarce supply. Unanticipated demands, especially from manufacturers of synthetic resins, are largely responsible for the shortage in both of these commodities, but producers seem optimistic regarding the possibilities of clearing up the situation shortly. Of course this tight situation existing in all of these commodities has made all these markets very strong.

Copper, and along with it, copper sulfate, has continued its startling advance during the past month. Consumers of the metal seem willing to buy at any level and prices have continued to sky-rocket upward. As sulfate production costs increase proportionately, prices there have continued higher also. Despite increasing production, demand for alkalies has also grown to such an extent that some quarters report a condition resembling shortage in the market for soda caustic. The entire group continues firm and in excellent demand.

During the past month, domestic mercury has disappeared from the market, as production is sold up, and with the return of the imported material to power, has come stronger market conditions with advancing prices. Alcohol is in very strong position but the various acetate solvents have been in unsteady price conditions with much shading and selling under schedule. The producer of ethylene glycol and that group of solvents has announced reductions in price on most members of the group, and the market is firm at the lower figures.

Chief interest in the fertilizer group is centered about sodium nitrate which is now being held very firmly at scheduled price. It now seems almost certain that American interests will join the centralized sales organization. Although the price tendency is higher in general, trading in oils and fats has not been especially active during the past month.



Business indicators prepared by the Department of Commerce. The weekly average 1923-1925 inclusive = 100. The solid line represents 1929 and the dotted line 1928.

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Feb. 1929 $1.025

Acetone — Demand continues very good and producers expect no changes in price despite the fact that the tariff is expected to be placed on this item in England about July 1. The tariff had been placed on acetone and then removed at the request of the British producers who had not yet come into production. However, rapid progress is being made on the plant and it seems quite likely that the tariff will go into effect to stay about July 1. This will of course automatically remove a large market for the material produced in this country, but it is thought that the rapidly increasing production of cellulose acetate rayon will compensate for the loss of trade in that direction.

Acid Acetic — Has been very firm with deliveries moving forward in increasing quantities during the past month as the wood distillation season is at its peak. An item which seldom comes to the attention of the market in and around New York, is the fact that many of the new demands of the South, with the rapid expansion of the rayon industry, are being met by new production of the acid down there, some of it by new processes. Over 3,000,000 pounds of acid were imported for consumption in this country during November, 1928, bringing the total for the first 11 months of the year up to over 15,000,000 pounds. Imports entered for consumption on not more than 65 per cent. acetic acid have been as follows: 1926, 7,026,859 pounds, valued at $289,282; 1927, 6,766,512 pounds, valued at $350,421; and 1928 (11 months) 10,120,525 pounds, valued at 988,267. Imports of more than 65 per cent. acetic acid have been: 1926, 1,995, 982 pounds, valued at $232,855; 1927, 3,784 504 pounds, valued at $454,382; and 1928 (11 months) 5,111,190 pounds, valued at $616,907. According to the Bureau of the Census, domestic production in 1925 was 29,824,953 pounds of dilute acetic acid, 35,020,394 pounds of glacial acetic acid, and 2,088,567 pounds of anhydric acetic acid. The value of the anhydride amounted to $591,820 and of the total production of dilute and glacial acids, there were produced for sale 28,722, 303 pounds of dilute acid, having a value of $775,668, and 34,780,683 pounds for sale of glacial acid, valued at $3,070,134. In 1927, there were produced for sale

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
.26	.18½	.24	.24	Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21	.18½
				Acetaldol, 50 gal dr.....lb.	.27	.31	.27
.24	.23	.20	.20	Acetanilid, tech, 150 lb bbl...lb.	.23	.24	.23
.35	.29	.29	.29	Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.29	.35	.29
.....	.....	.38	.32	Acetin, tech drums.....lb.	.30	.32	.30
.15	.13	.....	.....	Acetone, CP, 700 lb drums c-l wks.....lb.	.....	.15	.15
.15	.13	.12	.12				
1.75	1.65	1.65	1.65	Acetone Oil, bbls NY.....gal.	1.15	1.25	.115
.45	.42	.42	.42	Acetyl Chloride, 100 lb cby...lb.	.42	.45	.42
				Acetylene Tetrachloride (see tetrachlorethane).....			
				Acids			
				Acid Acetic, 28% 400 lb bbls			
3.88	3.38	3.38	3.38	c-l wks.....100 lb.	.....	3.88	3.88
13.68	11.92	11.92	11.92	Glacial, bbl c-l wk.....100 lb.	.....	13.68	13.68
1.00	.98	.98	.98	Anthranilic, refd, bbls.....lb.	.98	1.00	1.00
.80	.80	.80	.80	Technical, bbls.....lb.	.....	.80	.80
2.25	1.60	1.60	1.25	Battery, cbys.....100 lb.	1.60	2.25	2.25
.60	.57	.57	.57	Benzoic, tech, 100 lb bbls....lb.	.57	.60	.60
				Boric, crys. powd, 250 lb bbls.....lb.	.05¾	.06	.06
.11	.08½	.08½	.08½				
1.25	1.25	1.25	1.25	Broenner's, bbls.....lb.	.....	1.25	1.25
.90	.85	.85	.80	Butyric, 100% basis cbys.....lb.	.85	.90	.90
4.85	4.85	4.90	4.85	Camphoric.....lb.	.....	4.85	4.85
.28	.13	.25	.25	Carbolic, 10%, 50 gal bbls....lb.	.13	.14	.14
				Chlorosulfonic, 1500 lb drums			
.16	.15	.15	.15	wks.....lb.	.04½	.05½	.05½
.30	.25	.37	.25	Chromic, 99%, drs extra.....lb.	.20	.23	.23
1.06	1.00	1.00	1.00	Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.06
				Citric, USP, crystals, 230 lb bbls.....lb.	.46	.59	.59
.44½	.59	.44½	.43				
.97	.95	.95	.95	Cleve's, 250 lb bbls.....lb.	.52	.54	.54
.70	.68	.60	.57	Cresylic, 95%, dark drs NY...lb.	.60	.70	.70
.72	.72	.70	.60	97-99%, pale drs NY.....lb.	.72	.77	.77
				Formic, tech 85%, 140 lb cby.....lb.	.11	.12	.12
.12	.11	.11	.10				
.55	.50	.50	.50	Gallic, tech, bbls.....lb.	.50	.55	.55
.74	.74	.74	.69	USP, bbls.....lb.	.....	.74	.74
1.06	1.00	1.00	1.00	Gamma, 225 lb bbls wks.....lb.	.97	.99	.99
.63	.57	.57	.57	H, 225 lb bbls wks.....lb.	.68	.72	.72
.67	.67	.67	.65	Hydriodic, USP, 10% soln cby lb.	.....	.67	.67
				Hydrobromic, 48%, coml, 155			
.48	.45	.45	.45	lb cbys wks.....lb.	.45	.48	.48
				Hydrochloric, CP, see Acid Muriatic.....		.....	.....
.90	.80	.80	.80	Hydrocyanic, cylinders wks...lb.	.80	.90	.90
				Hydrofluoric, 30%, 400 lb bbls			
.06	.06	.06	.06	wks.....lb.	.....	.06	.06
				Hydrofluosilicic, 35%, 400 lb			
.11	.11	.11	.11	bbls wks.....lb.	.....	.11	.11
				Hypophosphorous, 30%, USP,			
.85	.85	.85	.85	demijohns.....lb.	.....	.85	.85
.06	.04¾	.05½	.05½	Lactic, 22%, dark, 500 lb bbls lb.	.04¾	.05½	.05½
.13½	.12	.13	.13	44%, light, 500 lb bbls.....lb.	.12	.12½	.12½
.54	.52	.52	.52	Laurent's, 250 lb bbls.....lb.	.40	.42	.42
.60	.48	.....	.....	Malic, powd., kegs.....lb.	.48	.60	.60
.65	.60	.60	.60	Metanilic, 250 lb bbls.....lb.	.60	.65	.65
				Mixed Sulfuric-Nitric.....			
.08	.07¾	.07¾	.07¾	tanks wks.....N unit	.07	.07¼	.07¼
.01½	.01	.01	.01	tanks wks.....S unit	.008	.01	.01
.21	.18	.21	.18	Monochloroacetic, tech bbl..lb.	.18	.21	.21
.65	.65	1.65	1.65	Monosulfonic, bbls.....lb.	1.65	1.70	1.70
				Muriatic, 18 deg, 120 lb cbys			
1.40	1.35	1.35	1.35	c-l wks.....100 lb.	.....	1.35	1.40
				tanks, wks. 100 lb.		1.00	1.00
1.80	1.70	1.70	1.70	20 degrees, cbys wks...100 lb.	.....	1.45	.....
.95	.85	.95	.95	N & W, 250 lb bbls.....	.85	.95	.95
.59	.55	.55	.55	Naphthionic, tech, 250 lb.....	.....	Nom.	.59
				Nitric, 36 deg, 135 lb cbys c-			
5.00	5.00	5.00	5.00	wks.....100 lb.	.....	5.00	5.00
				40 deg, 135 lb cbys, c-l			
6.00	6.00	6.00	6.00	wks.....100 lb.	.....	6.00	6.00
.11½	.10¾	.11¼	.11	Oxalic, 300 lb bbls wks NY...lb.	.11	.11½	.11½
.08½	.08	.08	.07	Phosphoric 50%, 150 lb cby..lb.	.08	.08½	.08½
.16	.16	.19	.16	Syrupy, USP, 70 lb drs....lb.	.....	.16	.16
.50	.50	.50	.50	Picramic, 300 lb bbls.....lb.	.65	.70	.70
.50	.40	.45	.30	Picric, kegs.....lb.	.40	.50	.50
				Pyrogalic, technical, 200 lb bbls.....lb.	.....	.86	.86
.86	.86	.86	.86				
.32	.27	.27	.27	Salicylic, tech, 125 lb bbl.....lb.	.37	.42	.42
.16	.15	.15	.15	Sulfanilic, 250 lb bbls.....lb.	.15	.16	.16
				Sulfuric, 66 deg, 180 lb cbys			
1.95	1.60	1.60	1.60	1c-l wks.....100 lb.	1.60	1.95	1.95
				tanks, wks. ton		15.50	15.50
1.37½	1.20	1.20	1.20	1500 lb dr wks.....100 lb.	1.50	1.65	1.65
1.12½	1.12½	1.10	1.10	60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.42½
				Oleum, 20%, 1500 lb. drs 1c-l			
1.52½	1.52½	1.50	1.50	wks .....100 lb.	.....	1.52½	1.52½

News Notes

"Over a Century of Service and Progress"

MARCH, 1929

Caustic Potash:

Our efforts to supply the American consumers of this product when and where they require it, have always been of paramount importance to us, and we believe we have succeeded in accomplishing this, not only as large importers of Caustic Potash, representing foreign producers, but also as manufacturers of this at our plant at Niagara Falls, N. Y. We can supply the imported in the usual Solid form, Walnut or Broken size and Granular, packed in various size drums. Stocks are maintained at all our branches, and at the principal Atlantic ports. From Niagara Falls stock we can supply the Solid, Flake and Liquid, and we are prepared to furnish special tests to meet buyers' specifications. We can make quick shipment, not only from abroad, but from all our distributing points as well, and your inquiries are respectfully solicited.

Carbonate of Potash:

As agents in this country for foreign producers, we are prepared to supply from spot stocks maintained at convenient points, all of the commercial grades, the Calcined 80/95% and 96/98%, U. S. P. quality and the hydrated form. You will find us ready to supply these potashes for immediate shipment, and we would appreciate an opportunity of demonstrating this.

Quality and Price:

We will guarantee the quality of the above products to be second to none, and prices at the market, consistent with quality and delivery.

Permanganate of Potash:

The price advance which took place in this article some time ago has been well sustained. The demand has been particularly good during the past two months, with supplies ample to take care of buyers' requirements. We carry at all times spot stocks, both the Technical and U. S. P. fine crystal, packed in convenient 100 pound drums.

Chlorate of Potash:

Withdrawals at this season of the year are rather expected to be somewhat below par, but this is a condition which is generally looked for in the Winter months. We believe that the consumption is increasing however. We have good stocks of the imported U. S. P. powdered material in 112 pound kegs.

Factories:
Niagara Falls, N. Y.
Murphysboro, Ill.
Owego, N. Y.
Jersey City, N. J.

INNIS, SPEIDEN & CO.
INCORPORATED
46 CLIFF STREET, NEW YORK.

Branches:
Chicago
Boston
Philadelphia
Cleveland
Gloversville

Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Feb. 1929 $1.025

76,432,005 pounds of acetic acid, valued at $5,523,752, of which 46,228,162 pounds, having a value of $2,327,085, were dilute and 30,203,843 pounds, valued at $3,196,667, glacial and anhydride.

Acid Boric — It is reported that demand has increased and broadened since the lower prices announced here last month, had the effect of widening the market and bringing more users into the field. Prices have been firm at the lower figures.

Acid Citric — As the season has progressed demand has increased and is reported to have been quite good during the past month. According to further reports from Italy the citric acid industry there is considering further centralization as it is at present so split up that there is no possibility of a harmonious synchronization of effort leading to lower costs of production. In Sicily a clear distinction is usually made between lemon growers, essential oil factories, calcium citrate producers and citric acid plants. Sicilian manufacturers of citric acid frequently process crude lemon juice purchased directly from the "trappeti" or fruit presses and extract therefrom fair quantities of alcohol. If the manufacture of calcium citrate were centralized in a few large plants instead of being as it is, scattered among numerous small factories, it would be possible to obtain 1¼ liters of alcohol for every six kilos of calcium citrate; therefore, out of an average production of 6,000 tons of citrate it would be possible to obtain as a coproduct 15,000 "ettanidri" or 15,000 hectoliters of alcohol 95 per cent. pure.

Acid Oxalic — Continues very firm producers well sold up and working to capacity to keep up with shipments. Some imported material continues to come in but in very small quantities which continue to decrease as domestic material continues to replace it.

Acid Sulfuric — Continues to show the way to the other mineral acids, all of which are in very heavy demand. Production is well taken up and the market continues in tight position. All efforts have been directed towards meeting contract demand, so that very little material has been available on the open market. Prices are very firm and likely to continue so for some time.

Acid Tartaric — Although demand has been only fair for this season of the year, prices have been firm due to somewhat higher cost of raw material.

Alcohol — Denatured continues strong with prices firm. This season has been marked by what is probably the least deviation from published price schedules

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
42.00	42.00	42.00	42.00	40%, 1c-1 wks net ton	.....	42.00	42.00	42.00
.40	.30	.30	.30	Tannic, tech, 300 lb bbls lb.	.30	.40	.40	.30
.38	.34½	.37	.29½	Tartaric, USP, crys, powd, 300 lb. bbls lb.	.38	.38½	.38½	.38
.85	.85	.85	.85	Tobias, 250 lb bbls lb.	.....	.85	.85	.85
2.75	2.75	2.75	2.00	Trichloroacetic bottles lb.	.....	2.75	2.75	2.75
2.00	2.00	2.00	2.00	Kegs lb.	.....	2.00	2.00	2.00
1.25	1.00	1.00	1.00	Tungstic, bbls lb.	1.00	1.25	1.25	1.00
.55	.43	.45	.45	Albumen, blood, 225 lb bbls lb.	.43	.47	.47	.43
.84	.78	.95	.80	Egg, edible lb.	.76	.81	.75	.70
.80	.70	.92	.77	Technical, 200 lb cases lb.	.70	.75	.80	.70
.65	.60	.60	.60	Vegetable, edible lb.	.60	.65	.65	.60
.55	.50	.50	.50	Technical lb.	.50	.55	.55	.50
				Alcohol				
.20	.18½	.20	.19	Alcohol Butyl, Normal, 50 gal drs c-l wks lb.	.....	.1775	.17½	.17½
.19½	.18½	.20½	.19½	Drums, 1-c-1 wks lb.	.....	.1825	.18½	.18½
.19	.17½	.19½	.18½	Tank cars wks lb.	.....	.1725	.17½	.17½
2.25	1.75	.....	.....	Amyl (from pentane) drs c-l wks gal.	.....	1.67	1.67	1.67
1.80	1.70	1.70	1.70	Diacetone, 50 gal drs del gal.	1.70	1.80	1.80	1.70
3.70	2.65	3.70	3.70	Ethyl, USP, 190 pf, 50 gal bbls gal.	.....	2.69½	2.69½	2.69½
.55	.50	.50	.50	Anhydrous, drums gal.	.....	.71	.71	.71
.52	.48½	.52	.37½	Completely denatured, No. 1, 190 pf, 50 gal drs drums extra gal.	.....	.49	.49	.49
.50	.43	.50	.29	No. 5, 188 pf, 50 gal drs. drums extra gal.	.....	.48	.48	.48
.46	.41	.46	.25	Tank, cars gal.	.....	.46	.46	.46
1.25	1.00	1.00	1.00	Isopropyl, ref, gal drs gal.	1.00	1.25	1.25	1.00
1.00	1.00	1.00	1.00	Propyl Normal, 50 gal dr. gal.	.....	1.00	1.00	1.00
.82	.80	.80	.80	Aldehyde Ammonia, 100 gal dr lb.	.80	.82	.82	.80
.65	.65	.65	.65	Alpha-Naphthol, crude, 300 lb bbls lb.	.....	.65	.65	.65
.37	.35	.35	.35	Alpha-Naphthylamine, 350 lb bbls lb.	.32	.34	.34	.32
3.30	3.25	3.25	3.15	Alum Ammonia, lump, 400 lb bbls, 1c-1 wks 100 lb.	3.25	3.30	3.30	3.25
5.50	5.25	5.25	5.25	Chrome, 500 lb casks, wks 100 lb.	5.25	5.50	5.50	5.25
3.20	3.10	3.50	3.10	Potash, lump, 400 lb casks wks 100 lb.	3.00	3.10	3.20	3.00
5.50	5.25	5.25	5.25	Chrome, 500 lb casks wks 100 lb.	5.25	5.50	5.50	5.25
3.75	3.75	3.75	3.75	Soda, ground, 400 lb bbls wks 100 lb.	.....	3.75	3.75	3.75
26.00	24.30	27.00	26.00	Aluminum Metal, c-1 NY 100 lb.	.....	24.30	24.30	24.30
.40	.35	.35	.35	Chloride Anhydrous, 275 lb drums lb.	.35	.40	.40	.35
.18	.17	.17	.17	Hydrate, 96%, light, 90 lb bbls lb.	.17	.18	.18	.17
.24	.18	.23	.23	Stearate, 100 lb bbls lb.	.25	.26	.26	.25
1.75	1.75	1.75	1.75	Sulfate, Iron, free, bags c-1 wks 100 lb.	1.95	2.05	2.05	1.95
1.40	1.40	1.40	1.35	Coml, bags c-1 wks 100 lb.	.....	1.40	1.40	1.40
1.15	1.15	1.15	1.15	Aminoazobenzene, 110 lb kegs lb.	.....	1.15	1.15	1.15
				Ammonium				
.14	.13½	.13½	.10	Ammonia, anhyd, 100 lb cyl. lb.	.14	.14	.14	.14
.03	.03	.03	.02½	Water, 26°, 800 lb dr del lb.	.....	.03½	.03½	.03½
.22	.21	.21	.21	Bicarbonate, bbls., spot 100 lb.	6.00	6.50	6.50	6.00
.09	.08¼	.08¼	.08¼	Bifluoride, 300 lb bbls lb.	.21	.22	.22	.21
5.15	4.45	5.05	4.85	Carbonate, tech, 500 lb cs. lb.	.09	.12	.12	.09
5.75	5.25	.07	.05½	Chloride, white, 100 lb. bbls wks 100 lb.	4.45	5.15	5.15	4.45
.11½	.11	.11	.11	Gray, 250 lb bbls wks lb.	5.25	5.75	5.75	5.25
.16	.15	.15	.15	Lump, 500 lb cks spot lb.	.11	.11½	.11½	.11
.10	.06	.06	.06	Lactate, 500 lb bbls lb.	.15	.16	.16	.15
.38	.27½	.27½	.27½	Nitrate, tech, casks lb.	.06	.10	.10	.06
.18	.18	.18	.18	Persulfate, 112 lb kegs lb.	.31	.34	.34	.31
2.90	2.20	2.30	2.55	Phosphate, tech, powd, 325 lb bbls lb.	.12½	.13	.13	.12½
3.00	2.50	2.55	2.35	Sulfate, bulk c-1 100 lb.	2.35	2.40	2.40	2.35
60.85	60.85	59.70	56.85	Southern points 100 lb.	.....	2.45	2.45	2.45
.60	.55	.55	.55	Nitrate, 26% nitrogen 31.6% ammonia imported bags ton	.....	60.85	60.85	60.85
2.25	1.72	2.25	1.90	Sulfocyanide, kegs lb.	.36	.48	.48	.36
.....	.....	.....	.....	Amyl Acetate, (from pentane) drs gal.	1.60	1.70	1.70	1.60
				Tech., drs gal.	1.60	1.70	1.70	1.60
				Alcohol, see Fusel Oil				
.16½	.15½	.15½	.15	Furoate, 1 lb tins lb.		5.00		
.48	.41	.41	.41	Aniline Oil, 960 lb drs lb.	.15½	.16½	.16½	.15½
1.00	.90	.90	.90	Annatto, fine lb.	.34	.37	.37	.34
.12	.09½	.11½	.14	Anthraquinone, sublimed, 125 lb bbls lb.	.80	.90	.90	.80
.12	.10	.15½	.14	Antimony, metal slabs, ton lots lb.	.....	.09½	.09½	.09½
.18	.17	.17	.17	Needle, powd, 100 lb cs lb.	.....	.10	.10	.10
.12	.09½	.16½	.16½	Chloride, soln (butter of) cbys lb.	.17	.18	.18	.17
.....	.....	.28	.25½	Oxide, 500 lb bbls lb.	.....	.09½	.09½	.09½
.20	.16	.20	.16	Salt, 66%, tins lb.	.25½	.26	.26	.25½
.42	.38	.42	.37½	Sulfuret, golden, bbls lb.	.16	.20	.20	.16
.19	.17	.18	.18	Vermilion, bbls lb.	.38	.42	.42	.38
.14	.12	.12	.12	Archil, conc, 600 lb bbls lb.	.17	.19	.19	.17
.16	.15	.16	.14	Double, 600 lb bbls lb.	.12	.14	.14	.12
.08	.08	.15	.12½	Triple, 600 lb bbls lb.	.15	.16	.16	.15
.16	.15	.08	.03	Argols, 80%, casks lb.	.....	.08	.08	.08
.11	.10½	.10½	.10½	Coude, 30%, casks lb.	.15	.16	.16	.15
.04	.03¾	.04	.03¾	Arsenic, Red, 224 lb kegs, cs lb.	.09	.11	.11	.09
14.75	14.75	14.75	14.75	White, 112 lb kegs lb.	.04	.04½	.04½	.04
				Asbestine, c-1 wks ton	.....	15.00	15.00	14.75

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Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Feb. 1929 $1.025

in the history of the industry. Some of the strength of the market at present is attributed in some quarters to the preliminary reports from the molasses crop which is said to be considerably smaller than anticipated, some estimates placing it at less than half of what had been expected. Whether such a pessimistic outlook is entirely justified is not apparent at present, but indications do seem to point to the fact that the crop is short. The past month has witnessed the germ of another merger, this time a small one, between two firms in the South and two in the mid-West. According to the biennial census of manufacturers taken in 1928, the establishments engaged primarily in the manufacture of ethyl alcohol in 1927, of which there were 28, reported products valued at $33,971,150, a decrease of 41.1 per cent. as compared with $57,705,704 for 1925, the last preceeding census year. Production during December, 1928, as reported by members of the Industrial Alcohol Institute, amounted to 9,715,746 wine gallons. Combined inventories, as of December 31 were as follows: ethyl alcohol, 4,865,270 W. G.; C. D. alcohol, 3,887,993 W. G.; S. D. alcohol, 796,228 W. G.; total 9,549,491 W. G. Butyl alcohol is also reported as being in strong position with prices firm at the reduction announced two months ago.

Ammonia — Producers report that no difficulty was encountered in obtaining higher prices on anhydrous announced here last month. Both aqua and anhydrous are very firm and largely sold up for the remainder of the year. Shipments on contract have been proceeding in good volume.

Ammonium Chloride — The past month has been a very good one for the white material. Producers report that sales have been in surprisingly large volume, exceeding those of February of last year by a large margin. As consumption has reached the point where it no longer increases, the explanation doubtless lies in that fact that imported tonnage is being replaced by domestic material at a tremendous rate.

Ammonium Sulfate — Has been very inactive during the past month with more offerings than buyers. The season has been very slack thus far, but prices continue unchanged at $2.35 @ $2.40 per 100 lbs., and it is thought that conditions will soon show improvement.

Antimony — For the second month in succession the market has been quiet and inactive with no price changes since those last reported.

Barium Chloride — Has been very firm during the past month with the close of the month marked by a sudden increase

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
				Barium			
57.00	47.00	47.50	47.50	Barium, Carbonate, 200 lb bags wks....ton	57.00	58.00	57.00
.12½	.12	.12	.12	Chlorate, 112 lb kegs NY..lb.	.14	.15	.14
65.00	54.00	65.00	57.50	Chloride, 800 lb bbl wks...ton	65.00	68.00	63.00
.13½	.13	.13	.13	Dioxide, 88%, 690 lb drs...lb.	.12	.13	.12
.04½	.04¾	.04¼	.04¼	Hydrate, 500 lb bbls.....lb.	.04¾	.05½	.04¾
.08	.07½	.07½	.07½	Nitrate, 700 lb casks.....lb.	.08½	.08½	.08½
24.00	23.00	23.00	23.00	Barytes, Floated, 350 lb bbls wks.....ton	23.00	24.00	23.00
8.00	5.00	.....	.....	Bauxite, bulk, mines.....ton	5.00	8.00	5.00
.38	.36	.40	.37	Beeswax, Yellow, crude bags..lb.	.36	.37	.36
.43	.41	.46	.38	Refined, cases.....lb.	.41	.42	.41
.58	.56	.58	.56	White, cases.....lb.	.51	.53	.51
.70	.65	.65	.65	Benzaldehyde, technical, 945 lb drums wks.....lb.	.60	.65	.60
				Benzene			
.23	.21	.23	.21	Benzene, 90%, Industrial, 8000 gal tanks wks.....gal.	.....	.23	.23
.23	.21	.23	.21	Ind. Pure, tanks works....gal.	.....	.23	.23
.74	.70	.70	.70	Benzidine Base, dry, 250 lb bbls.....lb.	.70	.74	.74
1.00	1.00	1.00	1.00	Benzoyl, Chloride, 500 lb drs.lb.	.....	1.00	1.00
.25	.25	.....	.....	Benzyl, Chloride, tech drs....lb.	.....	.25	.25
.26	.24	.24	.24	Beta-Naphthol, 250 lb bbl wk.lb.	.24	.26	.26
1.35	1.35	1.35	1.35	Naphthylamine, sublimed, 200 lb bbls.....lb.	.....	1.35	1.35
.65	.63	.63	.63	Tech, 200 lb bbls.....lb.	.65	.68	.68
90.00	80.00	80.00	80.00	Blanc Fixe, 400 lb bbls wks..ton	80.00	90.00	90.00
				Bleaching Powder			
2.25	2.25	2.25	2.00	Bleaching Powder, 300 lb drs c-1 wks contract.....100 lb.	.....	2.25	2.25
2.00	2.00	2.25	2.00	700 lb drs c-1 wks contract .....100 lb.	.....	4.00	4.00
5.25	4.65	3.75	4.75	Blood, Dried, fob, NY.....Unit	.....	4.60	4.60
5.35	4.75	.....	.....	Chicago.....Unit	.....	4.75	4.85
5.05	4.50	.....	.....	S. American shipt.....Unit	.....	4.60	4.70
.35	.31	.30	.28	Blues, Bronze Chinese Milori Prussian Soluble.....lb.	.32	.34	.34
30.00	29.00	38.00	29.00	Bone, raw, Chicago.....ton	.....	42.00	42.00
.07	.06	.06½	.06	Bone, Ash, 100 lb kegs.....lb.	.06	.07	.07
.08½	.08½	.08½	.08½	Black, 200 lb bbls.....lb.	.....	.08½	.08½
37.00	31.00	30.00	28.00	Meal, 3% & 50%, Imp....ton	.....	35.00	35.00
.05	.02½	.04½	.04½	Borax, crys, 500 lb bbls.....lb.	.02½	.03½	.03¼
.12	.10½	.11	.11	Bordeaux, Mixture, 16% pwd.lb.	.10½	.12	.12
.10	.08	.08	.08	Paste, bbls.....lb.	.10	.10½	.10½
28.00	26.00	28.00	26.00	Brazilwood, sticks, shpmt....lb.	26.00	28.00	28.00
1.20	.60	.60	.60	Bronze, Aluminum, powd blk.lb.	.60	1.20	1.20
1.25	.55	.55	.55	Gold bulk.....lb.	.55	1.25	1.25
1.60	1.40	1.60	1.42	Butyl, Acetate, normal drs 1c-1 wks.....gal.	1.40	1.45	1.45
1.55	1.35	1.55	1.42	Tank, drs wks.....gal.	.....	1.35	1.35
1.05	1.00	1.00	1.00	Secondary, 50 gal drs.....gal.	1.00	1.05	1.05
.70	.70	.70	.70	Aldehyde, 50 gal drs wks...lb.	.....	.70	.70
				Carbitol (see Diethylene Glycol Mono Butyl Ether).....	.....	.....	.....
				Cellosolve (see Ethylene glycol mono butyl ether).....			
				Furoate, 1 lb tins.....lb.	.....	5.00	
.36	.34	.34	.34	Propionate, drs.....lb.	.34	.36	.36
.60	.60	.60	.60	Stearate, 50 gal drs.....lb.	.....	.60	.60
.60	.57	.57	.57	Tartrate, drs.....lb.	.57	.60	.60
2.00	1.35	1.50	1.35	Cadmium, Sulfide, boxes.....lb.	.75	1.00	1.00
				Calcium			
4.50	3.50	3.50	3.50	Calcium, Acetate, 150 lb bags c-1.....100 lb.	.....	4.50	4.50
.09	.06	.07½	.07½	Arsenate, 100 lb bbls c-1 wks.....lb.	.07	.09	.09
.06	.05	.05	.05	Carbide, drs.....lb.	.05	.06	.06
1.00	1.00	1.00	1.00	Carbonate, tech, 100 lb bags c-1.....lb.	1.00	1.00	1.00
27.00	25.00	27.00	27.00	Chloride, Flake, 375 lb drs c-1 wks.....ton	.....	25.00	25.00
23.00	20.00	21.00	21.00	Solid, 650 lb drs c-1 fob wks .....ton	20.00	20.00	20.00
52.00	52.00	52.00	52.00	Nitrate, 220 lb bbls c-1 NY.ton	.....	52.00	52.00
.....	.....	.....	.....	Peroxide, 100 lb. drs.....lb.	.....	1.25	1.25
.08	.07	.09	.09	Phosphate, tech, 450 lb bbls lb.	.08	.08¼	.08
				Stearate, 100 lb bbls.....lb.	.25	.26	
.18	.18	.....	.....	Camwood, Bark, ground bbls..lb.	.....	.18	.18
.28	.22	.33	.33	Candelilla Wax, bags.....lb.	.....	.22	.22
				Carbitol, (See Diethylene Gycol Mono Methyl Ether).....	.....	.....	.....
.15	.08	.08	.08	Carbon, Decolorizing, 40 lb bags c-1.....lb.	.08	.15	.15
.12	.12	.12	.12	Black, 100-300 lb cases 1c-1 NY.....lb.	.....	.12	.12
.06	.05½	.05½	.05½	Bisulfide, 500 lb drs 1c-1 NY.....lb.	.05½	.06	.06
.06	.06	.06	.06	Dioxide, Liq. 20-25 lb cyl...lb.	.....	.06	.06
.07½	07	.07	.07	Tetrachloride, 1400 lb drs delivered.....lb.	.06½	.07½	.07½
.58	.45	.50	.50	Carnauba Wax, Flor, bags....lb.	.42	.43	.43
.60	.40	.90	.54	No. 1 Yellow, bags.....lb.	.39	.40	.40
.38	.34	.37	.24	No. 2 N Country, bags.....lb.	.30	.32	.32
.56	.38	.68	.48	No. 2 Regular, bags.....lb.	.....	.34	.36
.32	.25	.....	.....	No. 3 N. C.....lb.	.....	.25	.25
.32	.25½	.....	.....	No. 3 Chalky.....lb.	.....	.26	.26
.18½	.14½	.18½	.15½	Casein, Standard, ground.....lb.	.15½	.16	.16

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Feb. 1929 $1.025

in demand. This demand was heavier than that usual for that time and consumers were ordering in larger amounts, indicating, apparently that consumption is still increasing. Stocks, however, were sufficient to meet this unexpected demand as producers had evidently been anticipating it and running plants at full capacity continuously even when the demand did not require it.

Beeswax — Although yellow continues firm and in fairly good demand at prevailing prices, white has fallen off considerably and is now quoted at 51c @ 53c lb.

Benzene — Demand continues to slacken from the high point reached at the close of last year, but is still heavy notwithstanding. The market is well sustained and prices firm at previously quoted figures.

Bleaching Powder — Has been quiet during the past month and marked by but little activity. Prices, however, have been well maintained.

Blood — The fact that it is getting later in the season is indicated by lower prices on shipments from South America which are quoted now at $4.60 per unit. The New York market is at the same figure while Chicago is at $4.75 per unit.

Butyl Acetate — In common with the other members of this group, has been in rather unsteady position during the past month. Price concessions have been the order of the day and quantities have been sold at 5c gal. below quoted figures.

Calcium Acetate — The general situation remains about the same with the market in very healthy position. Demand continues unabated and about equal to production at the present time. Plants are operating to capacity and shipments being made as fast as the material is produced. In addition to quantities moving out on contract considerable new business has been in evidence during the past month.

Calcium Carbide — Exports during 1928 decreased 23 per cent. in quantity but only 12 per cent. in value by comparison with the previous year, according to the Department of Commerce. This export trade for the two periods was as follows: 1927—4,873,260 pounds, $197,361; 1928—3,745,900 pounds, $173,382. The best foreign markets in 1928 for United States calcium carbide were the Philippines, $67,600; Mexico, $34,000; Venezuela, $10,140; Colombia, $8,700; Panama, $9,600; Cuba, $5,800; Nicaragua, $7,300 and Honduras, $4,500. United States carbide exports to European and Canadian markets are negligible, as American owned plants have been producing there since 1922. The decline in

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
				Cellosolve (see Ethylene glycol mono ethyl ether)			
				Acetate (see Ethylene glycol mono ethyl ether acetate)			
.30	.26	.34	.26	Celluloid, Scraps, Ivory cs....lb.	.26	.30	.26
.20	.18	.18	.18	Shell, cases.....lb.	.18	.20	.18
.32	.30	.34	.26	Transparent, cases.....lb.	.30	.32	.30
1.40	1.40	1.40	1.40	Cellulose, Acetate, 50 lb kegs .lb.	1.20	1.25	1.20
.03½	.03	.03	.03	Chalk, dropped, 175 lb bbls..lb.	.03	.03½	.03
.04½	.04½	.02¼	.02½	Precip, heavy, 560 lb cks...lb.	.02	.03½	.02
.03½	.02¼	.04½	.04½	Light, 250 lb casks.....lb.	.02½	.03½	.02¼
.19	.18	.18	.18	Charcoal, Hardwood, lump, bulk wks.....bu.	.18	.19	.18
.06½	.06	.06	.06	Willow, powd, 100 lb bbl wks.....lb.	.06	.06½	.06
.05	.04	.04	.04	Wood, powd, 100 lb bbls...lb.	.04	.05	.04
.03	.02	.03	.02½	Chestnut, clarified bbls wks,..lb.	.02½	.03	.02
.02	.01½	.02	.01½	25% tks wks.....lb.	.01½	.02	.02
.04 4/5	.04 4/5	.05½	.05½	Powd, 60%, 100 lb bgs wks.lb.	.....	.04 4/5	.04 4/5
.06	.05½	.06½	.06½	Powd, decolorized bgs wks..lb.	.05½	.06	.06
9.00	8.00	8.00	8.00	China Clay, lump, blk mines.ton	8.00	9.00	9.00
.02	.01¾	.01¾	.01¾	Powdered, bbls.....lb.	.01¾	.02	.02
12.00	10.00	10.00	10.00	Pulverized, bbls wks.....ton	10.00	12.00	12.00
25.00	15.00	15.00	15.00	Imported, lump, bulk.....ton	15.00	25.00	25.00
.03½	.03	.03	.03	Powdered, bbls.....lb.	.03	.03½	.03½
				Chlorine			
.09	.08	.08	.08	Chlorine, cyls 1c-1 wks contract .....lb.	.08	.09	.09
.03½	.03½	.05½	.04	Liq tank or multi-car lot cyls wks contract.....lb.	.....	.03½	.03½
.07	.07	.07	.07	Chlorobenzene, Mono, 100 lb. drs 1c-1 wks.....lb.	.08½	.09½	.09½
.22	.20	.20	.20	Chloroform, tech, 1000 lb drs..lb.	.18	.20	.20
1.35	1.00	1.00	1.00	Chloropicrin, comml cyls.....lb.	1.00	1.35	1.35
.29	.26	.27	.26	Chrome, Green, CP.....lb.	.26	.29	.29
.11	.06½	.06½	.06½	Commercial.....lb.	.06½	.11	.11
.17	.15½	.17½	.16½	Yellow.....lb.	.15	.16	.16
.05½	.04¼	.05	.04½	Chromium, Acetate, 8% Chrome bbls.....lb.	.04¼	.05¼	.05¼
.05½	.05½	.05½	.05½	20° soln, 400 lb bbls.....lb.	.....	.05½	.05½
.28	.27	.27	.27	Fluoride, powd, 400 lb bbl..lb.	.27	.28	.28
.35½	.34½	.34½	.34½	Oxide, green, bbls.....lb.	.34½	.35½	.35½
9.50	9.00	9.50	9.00	Coal tar, bbls.....bbl	10.00	10.50	10.50
2.22	2.10	2.10	2.10	Cobalt Oxide, black, bags....lb.	2.10	2.22	2.22
.87	.84	.92	.77	Cochineal, gray or black bag..lb.	.....	.95	.95
.86	.86	.92	.77	Teneriffe silver, bags.....lb.	.....	.95	.95
				Copper			
17.00	12.90	13.57½	12.90	Copper, metal, electrol...100 lb.	.....	19.25	19.25
.17¼	.16	.16¾	.06¼	Carbonate, 400 lb bbls.....lb.	.18	.25	.25
.28	.28	.28	.28	Chloride, 250 lb bbls.....lb.	.25	.28	.28
.50	.48	.48	.48	Cyanide, 100 lb drs.....lb.	.48	.51	.51
.17	.16½	.16½	.16½	Oxide, red, 100 lb bbls.....lb.	.....	.18	.18
.19	.18	.18	.17	Sub-acetate verdigris, 400 lb bbls.....lb.	.18	.19	.19
5.50	5.05	5.00	4.75	Sulfate, bbls c-1 wks...100 lb.	.....	6.20	6.20
14.00	13.00	17.00	13.00	Copperas, crys and sugar bulk c-1 wks.....ton	13.00	14.00	14.00
1.35	1.25	1.25	1.25	Sugar, 100 lb bbls.....100 lb.	1.25	1.35	1.35
.42	.40	.40	.40	Cotton, Soluble, wet, 100 lb bbls.....lb.	.40	.42	.42
.....	.....	42.00	20.00	Cottonseed, S. E. bulk c-1...ton	.....	.....	.....
.....	.....	42.00	20.00	Meal S. E. bulk.....ton	.....	.....	.....
38.00	36.00	35.00	21.50	7% Amm., bags mills...ton	37.50	38.00	38.00
.27½	.26	.27	.22	Cream Tartar, USP, 300 lb. bbls.....lb.	.27¾	.28	.28
.42	.40	.40	.40	Creosote, USP, 42 lb cbys....lb.	.40	.42	.42
.19	.17	.20	.20	Oil, Natural, 50 gal drs....gal.	.17	.19	.19
.23	.21	.25	.25	10-15% tar acid.....gal.	.21	.23	.23
.28	.25	.....	.....	25-30% tar acid.....gal.	.25	.28	.28
.20	.17½	.17½	.17½	Cresol, USP, drums.....lb.	.14	.17	.17
				Crotonaldehyde, 50 gal dr....lb.	.32	.36	
.17	.16	.17	.16	Cudbear, English.....lb.	.16	.17	.17
.18½	.18½	.18½	.15	Cutch, Rangoon, 100 lb bales..lb.	.14	.16	.16
.07	.06	.05	.05½	Borneo, Solid, 100 lb bale..lb.	.08	08½	.08½
1.75	1.67½	1.82½	1.67½	Cyanamide, bulk c-1 wks Amm. .....lb.	.....	1.70	1.70
5.12	3.77	3.92	3.77	Dextrin, corn, 140 lb bags.100 lb.	4.62	4.82	4.82
5.07	3.72	3.87	3.72	White, 130 lb bags.....100 lb.	4.57	4.77	4.77
.09	.08	.08½	.08½	Potato, Yellow, 220 lb bgs..lb.	.08	.09	.09
.09	.08	.08½	.08½	White, 220 lb bags 1c-1....lb.	.08	.09	.09
.08¼	.08	.08¼	.08	Tapioca, 200 lb bags 1c-1..lb.	.08	.08¼	.08¼
.....	.....	3.80	3.80	Diaminophenol, 100 lb kegs..lb.	.....	3.80	3.80
3.80	3.80	2.95	2.85	Diamylphthalate, drs wks...gal.	.....	3.80	3.80
2.90	2.85	3.25	3.25	Dianisidine, 100 lb kegs.....lb.	3.00	3.10	3.10
.28	.26½	.31½	.29½	Dibutylphthalate, wks.....lb.	.....	.26½	.26½
.31½	.29½	.55	.55	Dibutyltartrate, 50 gal drs....lb.	.29½	.31½	.31½
.....	.....	.....	.....	Dichloroethylether, 50 gal drs lb.	.05	.07	.13
.65	.55	.23	.23	Dichloromethane, drs wks....lb.	.55	.65	.65
.25	.23	2.15	2.15	Diethylamine, 400 lb drs.....lb.	.23	.25	.25
2.15	2.15	1.85	1.85	Diethylcarbonate, drs .....gal.	1.85	1.90	1.90
2.00	1.85	.55	.55	Diethylaniline, 850 lb drs.....lb.	.55	.60	.60
.60	.55	20	.20	Diethyleneglycol, drs.....lb.	.10	.12	.13
.15	.10	.....	.....	Mono ethyl ether, drs....lb.	.13	.15	.15
.35	.25	.....	.....	Mono butyl ether, drs....lb.	.28	.30	.30
.....	.....	.....	.....	Mono methyl ether, 50 gal. dr.....lb.	.17	.20	.22
.....	.....	.....	.....	Diethylene oxide, 50 gal dr....lb.	.....	.50	.50
.67	.64	.64	.64	Diethylorthotoluidin, drs.....lb.	.64	.67	.67
.26	.24	.25	.25	Diethyl phthalate, 1000 lb drums.....lb.	.24	.26	.26
.35	.30	.30	.30	Diethylsulfate, technical, 50 gal drums.....lb.	.30	.35	.35
2.62	2.62	2.60	2.60	Dimethylamine, 400 lb drs...lb.	.....	2.62	2.62
.32	.30	.32	.30	Dimethylaniline, 340 lb drs...lb.	.30	.32	.32

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Feb. 1929 $1.025

foreign business in 1928 was attributable largely to smaller sales in the better markets, namely Philippines, $10,000 less; Venezuela, $5,000 less; Mexico, $6,000 less.

Carbon Black — Continues in very good demand, keeping pace with new automobile production and tendencies towards larger tires. Production during 1927 amounted to 198,429,000 pounds, valued at $10,955,000, according to the biennial census of manufactures. This compares with 177,417,378 pounds, valued at $9,639,585 produced in 1925, the last previous census year.

Carnauba Wax — Demand has been somewhat slack during the past month and as a result most of the grades are lower in price. Flor is unchanged, but No. 1, yellow, is at 39c @ 40c lb.; No. 2, N. C. at 30c @ 32c lb.; No. 2 regular at 34c lb.; and No. 3 chalky at 26c lb. Exports from Brazil for the first eight months of 1928 amounted to 4,665 kilos, valued at 481,000 pounds sterling, according to the Department of Commerce. Exports for 1927 amounted to 7,033,520 kilos, valued at £796,000; 1926, 5,768,000 kilos, valued at £684,000; and 1925, 4,114,591 kilos, valued at £499,000. Exports during the first eight months of 1928 have shown considerable decline both in price and value as compared with the same months of 1927. During both 1927 and 1928, the quantity exported in January was greater than the succeeding months. During the first eight months of 1927, exports of carnauba wax decreased gradually from 1,320 metric tons in January to 262 tons in August. In 1928, there was also the same tendency for exports to decrease each month but not so marked as in 1927. The United States takes about 40% of the exports of carnauba wax and Germany and Great Britain about 20% each. About 60% of all exports are from the port of Fortaleza, State of Ceara; and 30% from the port of Ilha Cajueriro, State of Mranhao. The leaves for wax are gathered twice a year, from August to October and from January to March.

Casein — Has continued to maintain its strong position throughout the past month and prices are the same as when last quoted, 15½c @ 16c lb. This is quite unusual for this season of the year, but buyers continue their efforts to anticipate requirements in view of the present tariff agitation which touches this product very strongly.

Chlorine — Continues firm and in good demand. Shipments have increased somewhat in volume during the past month, but otherwise there is nothing of note to report of this market.

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
.50	.45	.45	.45	Dimethylsulfate, 100 lb drs...lb.	.45	.50	.50	.45
.16½	.15½	.15½	.15	Dinitrobenzene, 400 lb bbls...lb.	.15½	.16½	.16½	.15½
.19	.18	.18	.18	Dinitrochlorine, 300 lb bbl....lb.	.18	.19	.19	.18
.16	.15	.15	.15	Dintrochlorobenzene, 400 lb bbls.....lb.	.13	.15	.15	.13
.34	.32	.32	.32	Dinitronaphthalene, 350 lb bbls .....lb.	.34	.37	.37	.34
.32	.31	.31	.31	Dinitrophenol, 350 lb bbls....lb.	.31	.32	.32	.31
.19	.18	.18	.15	Dinitrotoluene, 300 lb bbls...lb.	18	.19	.19	.18
.90	.48	1.05	.85	Diorthotolyguanidine, 275 lb bbls wks.....lb.	.42	.46	.49	.42
.....	.....	.....	.....	Dioxan (See Diethylene Oxide)	.....	.....	.....	.....
.47	.45	.18	.45	Diphenylamine.....lb.	.43	.47	.47	.43
.72	.40	.....	.....	Diphenylguanidine, 100 lb bbl lb.	.30	.35	.40	.30
.30	.26	.26	.26	Dip Oil, 25%, drums.....lb.	.26	.30	.30	.26
62.00	58.00	49.00	41.00	Divi Divi pods, bgs shipmt..ton	.....	55.00	57.00	55.00
.05½	.05	.04	.04	Extract.....lb.	.05	.05½	.05½	.05
.82	.73	.84	.72	Egg Yolk, 200 lb cases.....lb.	.77	.79	.80	.77
1.75	1.7	2.00	1.75	Epsom Salt, tech, 300 lb bbls c-1 NY.....100 lb.	1.70	1.75	1.75	1.75
.38	.37	.45	.37	Ether, USP, 1880, 50 lb drs..lb.	.38	.39	.39	.38
1.05	.75	.90	.90	Ethyl Acetate, 85% Ester, 110 gal drs.....gal.	1.02	1.05	1.05	1.02
1.25	1.10	1.10	1.03	99% gal drums.....gal.	1.22	1.25	1.25	1.22
.....	.....	.....	.....	Acetoacetate, 50 gal drs...gal.	.65	.68	.68	.65
1.11	1.05	1.05	1.05	Benzylaniline, 300 lb drs...lb.	1.05	1.11	1.11	1.05
.70	.70	.50	.50	Bromide, tech, drums .....lb.	.50	.55	.55	.50
.....	.....	.....	.....	Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.90	1.85
.22	.22	.22	.22	Chloride, 200 lb. drums....lb.	....	.22	.22	.22
.....	.....	.....	.....	Chlorocarbonate, 50 gal dr .gal.	.35	.40	.40	.35
.....	.....	.....	.....	Ether, Absolute, 50 gal drs..lb.	.50	.52	.52	.50
				Furoate, 1 lb tins .....lb.	.....	5.00	5.00	5.00
3.50	3.50	3.50	3.50	Lactate, drums works.....lb.	.30	.35	.35	.30
.30	.30	.30	.30	Methyl Ketone, 50 gal drs..lb.	.....	.30	.30	.30
.55	.45	.45	.45	Oxalate, drums works.....lb.	.45	.55	.55	.45
.36	.30	.....	.....	Oxybutyrate, 50 gal drs wks.lb.	.30	.36	.36	.30
.70	.70	.70	.70	Ethylene Bromide, 60 lb dr...lb.	.....	.70	.70	.79
.85	.75	.75	.75	Chlorhydrin, 40%, 50 gal drs chloro. cont.....lb.	.75	.85	.85	.75
.11	.07	.15	.11	Dichloride, 50 gal drums...lb.	.05	.07	.10	.05
.40	.25	.30	.30	Glycol, 50 gal drs wks.....lb.	.25	.28	.30	.25
.27	.31	.....	.....	Mono Butyl Ether drs wks.	.23	.27	.31	.23
.20	.24	.....	.....	Mono Ethyl Ether drs wks	.16	.20	.24	.16
.23	.26	.....	.....	Mono Ethyl Ether Acetate dr. wks.....	.19	.23	.26	.19
				Mono Methyl Ether, drs.lb.	.19	.23	.23	.19
				Oxide, cyl.....lb.	.....	2.00		
.65	.62	.62	.62	Ethylidenaniline.....lb.	.62	.65	.65	.62
25.00	20.00	20.00	20.00	Feldspar, bulk.....ton	40.00	25.00	25.00	20.00
21.00	15.00	15.00	15.00	Powdered, bulk works.....ton	15.00	.21	21.00	15.00
.09	.07½	.07½	.07½	Ferric Chloride, tech, crystal 475 lb bbls.....lb.	.07½	.09	.09	.07½
5.50&10	4.90&10	5.60	4.15	Fish Scrap, dried, wks.....unit	.....	Nom.	Nom.	Nom.
4.75&50	4.00&50	3.50	4.24	Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis...unit	.....	Nom.	Nom.	Nom.
1.15	1.10	1.10	.90	Flavine, lemon, 55 lb cases...lb.	1.10	1.15	1.15	1.10
1.15	1.10	1.10	.85	Orange, 70 lb cases.....lb.	1.10	1.15	1.15	1.10
				Flavseed.....lb.	.....	.....	.....	.....
.....	.....	.....	.....	Ex-dock.....ton	.....	.....	.....	.....
25.00	25.00	25.00	25.00	Fluorspar, 95%, 220 lb bags	.....	25.00	25.00	25.00
				Formaldehyde				
.....	.....	.....	.....	Formaldehyde, aniline, 100 lb. drums.....lb.	.....	.....	.....	.....
.42	.39	.39	.39	USP, 400 lb bbls lc-1 wks..lb.	.39	.42	.42	.39
.09	.08½	.11½	.08½	Fossil Flour.....lb.	.09½	.10	.10	.09½
.04	.02½	.02½	.02½	Fullers Earth, bulk, mines..ton	.02½	.04	.04	.02½
20.00	15.00	15.00	15.00	Imp. powd c-1 bags.....ton	15.00	20.00	20.00	15.00
30.00	25.00	25.00	25.00	Furan, 1 lb tins.....lb.	25.00	30.00	30.00	25.00
.19½	.17½	.17½	.17½	Furfural 500 lb drums .....lb.	.....	20.00	20.00	20.00
.....	.....	.....	.....	Furfuramide (tech) 100 lb dr..lb.	.17½	.19½	.19½	.17½
.....	.....	.....	.....	Furfuryl Acetate, 1 lb tins....lb.	.....	.30	.30	.30
.....	.....	.....	.....	Alcohol, 100 lb dr.....lb.	.....	5.00	5.00	5.00
.....	.....	.....	.....	Furoic Acid (tech) 100 lb dr...lb.	.....	.50	.50	.50
1.35	1.35	1.69	1.35	Fusel Oil, 10% impurities ...gal.	.....	1.00	1.00	1.00
.05	.04	.04	.04	Fustic, chips.....lb.	.04	1.35	1.35	1.35
.22	.20	.20	.20	Crystals, 100 lb boxes.....lb.	.20	.05	.05	.04
.10	.09	.09	.09	Liquid, 50°, 600 lb bbls....lb.	.09	.22	.22	.20
.23	.20	.20	.20	Solid, 50 lb boxes.....lb.	.14	.10	.10	.09
32.00	30.00	30.00	30.00	Sticks.....ton	25.00	.16	.16	.14
.52	.50	.50	.50	G Salt paste, 360 lb bbls.....lb.	.50	26.00	26.00	25.00
21	.20	.20	.20	Gall Extract.....lb.	.20	.52	.52	.50
.09	.08	.08	.06	Gambier, common 200 lb cs...lb.	.06	.21	.21	.20
.14	.12	.12	.12	25% liquid, 450 lb bbls....lb.	.12	.07	.07	.06
.12	.11	.23	.11	Singapore cubes, 150 lb bg..lb.	.08½	.14	.14	.12
.50	.45	.45	.30	Gelatin, tech, 100 lb cases....lb.	.45	.09	.09	.08½
3.24	3.14	3.14	3.14	Bags, c-1 NY.....100 lb.	3.14	.50	.50	.45
1.00	.70	1.05	1.05	Glauber's Salt, tech, 250 lb bags c-1 wks.....100 lb.	.70	3.24	3.24	3.14
3.34	3.24	3.24	3.24	Glucose (grape sugar) dry 70-80° bags c-1 NY.....100 lb.	3.24	1.00	1.00	.70
3.14	3.14	3.14	3.14	Tanner's Special, 100 lb bags .....100 lb.	.....	3.34	3.34	3.20
.24	.20	.20	.20	Glue, medium white, bbls ...lb.	.20	3.14	3.14	3.14
.26	.22	.22	.22	Pure white, bbls.....lb.	.22	.24	.24	.20
.19	.15	.29	.22	Glycerin, CP, 550 lb drs.....lb.	.15½	.26	.26	.22
.15	.11½	.25	.17	Dynamite, 100 lb drs.....lb.	.12	.16	.16	.15½
.10½	.08½	.....	.....	Saponification, tanks.....lb.	.08½	.12½	.12½	.12
.09½	.07½	.....	.....	Soap Lye, tanks.....lb.	.....	.08½	.08½	.08½
35.00	15.00	15.00	15.00	Graphite, crude, 220 lb bgs...ton	15.00	.07½	.07½	.07½
.09	.06	.05	.05	Flake, 500 lb bbls.....lb.	.06	35.00	35.00	15.00
				Gums		.09	.09	.06
.04½	.03½	.03½	.03½	Gum Accroides, Red, coarse and fine 140-150 lb bags.....lb.	.03½	.04½	.04½	.03½
.06½	.06	.06	.06	Powd, 150 lb bags.....lb.	.06	.06½	.06½	.06

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Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Feb. 1929 $1.025

Copper Sulfate — Has been advanced 55c per 100 lbs. in price since last reported. The metal price has advanced $2.25 per 100 lbs. during the same time and is expected to go higher momentarily. Consumers of copper are forcing the metal prices higher by an apparent willingness to buy at any level. Agricultural demand has been in good volume during the past month and demand on the whole has been very good, being better than February of a year ago and much better than the same month two years ago. Some of this may be attributed, however, to the fact that the season this year was slow starting. January was not up to normal and thus there has been quite a carryover into February, which accounts in part for the unusual volume of the past month's business.

Dibutylphthalate — Has been firm at quoted figures and in good demand during the past month.

Divi Divi — Demand has been very inactive and as a result pods are lower than when last quoted, being at $55.00 per ton.

Egg Yolk — Prices are again somewhat lower due to an effort on the part of importers to encourage demand. Quotations are at 77c @ 79c lb. Although the tariff has been increased on frozen eggs, powdered and shell egg products remain unchanged.

Ethyl Acetate — Has been very unsettled during the past month in common with other members of the group. Quantities have been sold at 5c per gallon under quoted figures.

Ethylene Glycol — A new price schedule has been announced during the past month which places the price at 25c lb. in carlots, and 26c @ 28c lb., less carlot. Other prices in this group of solvents were announced as follows: Cellosolve, 16c lb., tanks; 17c lb. in carlots; and 18c @ 20c lb. in less carlots. Cellosolve Acetate, 19c lb. in tanks; 20c lb., carlots, and 21c @ 23c lb. less carlots. Butyl Cellosolve, 23c lb., tanks; 24c lb. in carlots; and 25c @ 27c lb. in less carlots. Methyl Cellosolve, 19c lb. in tanks, 20c lb. in carlots, 21c @ 23c lb. in less carlots. Butyl Carbitol, 28c @ 30c lb., less carlots. Carbitol, 17c lb., carlots, 18c @ 20c lb., less carlots. Diethylene Glycol, 10c lb., carlots, 11c @ 12c lb., less carlots. Ethylene dichloride, 5c lb., carlots, 6c @ 7c lb., less carlots. Ethylene dichloride mixture, 6c lb. carlots, 7c @ 8c lb., less carlots. Dichloroethyl ether, 5c lb., carlots, 6c @ 7c lb., less carlots. Triethanolamine, 55c @ 60c lb., less carlots.

Formaldehyde — Demand continues very good and producers are still somewhat behind schedule in making deliveries.

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
.20	.18	.18	.18	Yellow, 150-200 lb bags....lb.	18	.20	.20	.18
.40	.35	.40	.35	Animi (Zanzibar) bean & pea 250 lb cases.....lb.	.35	.40	.40	.35
.55	.50	.60	.50	Glassy, 250 lb cases.....lb.	.50	.55	.55	.50
.12	.09	.09	.09	Asphaltum, Barbadoes (Manjak) 200 lb bags.....lb.	.09	.12	.12	.09
.17	.15	.15	.15	Egyptian, 200 lb cases.....lb.	.15	.17	.17	.15
65.00	55.00	55.00	55.00	Gilsonite Selects, 200 lb bags .....ton	58.00	65.00	65.00	58.00
.26	.22½	.26½	.26½	Damar Batavia standard 136, lb cases.....lb.	.23	.24	.26	.23
.11	.10½	.10½	.07	Batavia Dust, 160 lb bags.....lb.	.10½	.11	.11	.10½
.17½	.16	.18½	.17½	E Seeds, 136 lb cases.....lb.	.17	.17½	.17½	.17
.14½	.13	.14	.09	F Splinters, 136 lb cases and bags.....lb.	.13	.13½	.13½	.13
.30½	.29½	.34	.33½	Singapore, No 1, 224 lb cases lb.	.29	.30	.30½	.29
.24	.20	.22½	.21	No. 2, 224 lb cases.....lb.	.23	.23½	.24	.23
.15	.13½	.14	.11	No. 3, 180 lb bags.....lb.	.13½	.14	.14	.13½
.48	.33	.35	.30	Benzoin Sumatra, U. S. P. 120 lb cases.....lb.	.38	.40	.40	.38
.15	.14	.14	.12	Copal Congo, 112 lb bags, clean opaque.....lb.	.14	.15	.15	.14
.09	.08½	.08½	.08½	Dark, amber.....lb.	.08½	.09	.09	.08½
.14	.12½	.12½	.12½	Light, amber.....lb.	.12½	.14	.14	.12½
.36	.35	.35	.35	Water white.....lb.	.35	.36	.36	.35
.65	.58	.....	.....	Mastic.....lb.	.60	.62	.62	.60
.17½	.16	.16	.16	Manila, 180-190 lb baskets Loba A.....lb.	.17	.17½	.17½	.17
.16½	.15	.15	.15	Loba B.....lb.	.16	.16½	.16½	.16
.14	.13	.14½	.13	Loba C.....lb.	.14	.14½	.14½	.14
.19	.16	.16	.16	Pale bold, 224 lb cs.....lb.	.17	.19	.19	.17
.13½	.12	.14	.12	Pale nubs.....lb.	.13	.13½	.13½	.13
.11	.07½	.07½	.07½	East Indies chips, 180 lb bags lb.	.10	.11	.11	.10
.21	.17	.....	.....	Pale bold, 180 lb bags....lb.	.20	.21	.21	.20
.16	.14	.17	.17	Pale nubs.....lb.	.15	.16	.16	.15
.....	.....	.....	.....	Pontianak, 224 lb cases....lb.	.....	.....		
.25½	.22	.29	.25	Pale bold gen No 1.....lb.	.22	.23	.23	.22
.15	.13	.19	.13	Pale gen chips spot.....lb.	.14½	.15	.15	.14½
.14	.13	.14	.13	Elemi, No. 1, 80-85 lb cs...lb.	.13½	.14	.14	.13½
.13½	.13	.13	.12	No. 2, 80-85 lb cases.....lb.	.13	.13½	.13½	.13
.13	.12	.13	.11	No. 3, 80-85 lb cases.....lb.	.12	.13	.13	.12
.57	.50	.67½	.57	Kauri, 224-226 lb cases No. 1 .....lb.	.50	.57	.57	.50
.38	.35	.44½	.38	No. 2 fair pale.....lb.	.35	.38	.38	.35
.12	.10	.14½	.10	Brown Chips, 224-226 lb cases.....lb.	.10	.12	.12	.10
.....	.....	.42	.38	Bush Chips, 224-226 lb cases.....lb.	.38	.40	.40	.38
.....	.....	.....	.....	Pale Chips, 224-226 lb cases .....lb.	.24½	.26	.26	.24½
.26	.24½	.31½	.24½	Sandarac, prime quality, 200 lb bags & 300 lb casks...lb.	.63	.65	.65	.60
.60	.26	.27	.25	Helium, 1 lit. bot. .....lit.	.....	25.00	.20	.17
.....	.....	.....	.....	Hematine crystals, 400 lb bbls lb.	.17	.20	.11	.17
.20	.17	.12	.12	Paste, 500 bbls.....lb.	.....	.11	.11	.11
.11	.11	.09	.09	Hemlock 25%, 600 lb bbls wks lb.	.03½	.03½	.03½	.03½
.03¼	.03½	.03½	.03½	Bark.....ton	.....	16.00	16.00	16.00
16.00	16.00	16.00	16.00	Hexalene, 50 gal drs wks.....lb.	.....	.60	.60	.60
.60	.60	.60	.45	Hexamethylenetetramine, drs lb.	.56	.58	.58	.56
.56	.62	.80	.62	Hoof Meal, fob Chicago....unit	.....	3.90	4.00	3.90
4.00	4.00	3.35	2.75	South Amer. to arrive....unit	.....	3.90	3.90	3.90
.....	.....	3.90	3.0	Hydrogen Peroxide, 100 vol, 140 lb cbys.....lb.	.24	.26	.26	.24
.26	.24	.30	.22	Hypernic, 51°, 600 lb bbls....lb.	.12	.15	.15	.12
.15	.12	.12	.12	Indigo Madras, bbls.....lb.	1.28	1.30	1.30	1.28
1.30	1.28	1.28	1.20	20% paste, drums.....lb.	.15	.18	.18	.15
.18	.15	.15	.18	Solid, powder.....lb.	.07½	.08	.08	.07½
.08	.07½	.07½	.07½	Iron Chloride, see Ferric or Ferrous				
.10	.09	.09	.09	Iron Nitrate, kegs.....lb.	.09	.10	.10	.09
3.25	2.50	2.50	2.50	Coml, bbls.....100 lb.	2.50	3.25	3.25	2.50
.12	.10	.10	.10	Oxide, English.....lb.	.10	.12	.12	.10
.03½	.02½	.02½	.02½	Red, Spanish.....lb.	.02½	.03½	.03½	.02½
.90	.85	.85	.85	Isopropyl Acetate, 50 gal drs gal.	.85	.90	.90	.85
.20	.17	.29	.17	Japan Wax, 224 lb cases.....lb.	.....	.17½	.18	.17½
70.00	60.00	60.00	60.00	Kieselguhr, 95 lb bgs NY....ton	60.00	70.00	70.00	60.00
.....	.....	14.00	13.00	Lead Acetate, bbls wks...100 lb.	13.00	13.50	13.50	13.00
13.50	13.00	14.00	13.00	White crystals, 500 lb bbls wks.....100 lb.	14.00	14.50	14.50	14.00
.15	.13	.15½	.13½	Arsenate, drs 1c-1 wks.....lb.	.13	.15	.15	.13
				Dithiofuroate, 100 lb dr....lb.	.....	1.00		
6.25	6.25	7.80	6.20	Metal, c-l NY.....100 lb.	.....	6.10	6.10	6.10
.14	.14	.14	.14	Nitrate, 500 lb bbls wks....lb.	.....	.14	.14	.14
.18	.17½	.17½	.17½	Oleate, bbls.....lb.	.17½	.18	.18	.17½
.08½	.08½	.10½	.08½	Oxide Litharge, 500 lb bbls.lb.	.....	.08½	.08½	.08½
.09¼	.09½	.11½	.09½	Red, 500 lb bbls wks....lb.	.....	.09¾	.09¾	.09½
.09	.09	.09½	.09	White, 500 lb bbls wks...lb.	.....	.09½	.09½	.09
.08¼	.08½	.09	.08½	Sulfate, 500 lb bbls wk...lb.	.....	.08½	.08½	.08½
4.50	4.50	4.50	4.50	Lime, ground stone bags.....ton	.....	4.50	4.50	4.50
1.05	1.05	1.05	1.05	Live, 325 lb bbls wks...100 lb.	.....	1.05	1.05	1.05
				Lime Salts, see Calcium Salts				
.17	.15	.15	.15	Lime-Sulfur soln bbls.....gal.	.15	.17	.17	.15
.06½	.06½	.06½	.06½	Lithopone, 400 lb bbls 1c-1 wks .....lb.	.....	.05½	.06½	.05½
.08½	.08½	.08½	.08½	Logwood, 51°, 600 lb bbls.....lb.	.08½	.08½	.08½	.08½
.03½	.03	.03	.03	Chips, 150 lb bags.....lb.	.03	.03½	.03½	.03
.12½	.12½	.12	.12	Solid, 50 lb boxes.....lb.	.....	.12½	.12½	.12½
27.00	26.00	26.00	26.00	Sticks.....ton	24.00	26.00	26.00	24.00
.08	.07½	.07½	.07½	Lower grades.....lb.	.07½	.08	.08	.07½
.30	.30	.30	.30	Madder, Dutch.....lb.	.22	.25	.25	.22
50.00	48.00	48.00	48.00	Magnesite, calc, 500 lb bbl...ton	50.00	60.00	60.00	50.00
				Magnesium				
.06½	.06	.06½	.06	Magnesium Carb, tech, 70 lb bags NY.....lb.	.06	.06½	.06½	.06

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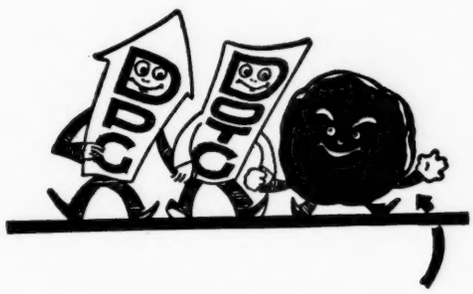

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Feb. 1929 $1.025

Plants are working to capacity and the situation is gradually clearing up. Prices are firm and unchanged.

Gums — This market has about returned to its normal channels. The outstanding exception is sandarac which has further continued its phenomenal rise and is now up to 63c @ 65c lb. The No. 1 and No. 2 grades of Singapore are lower, being at 29c @ 30c lb. and 23c @ 23½c lb. respectively. Damar Batavia is also lower at 23c @ 24c lb.

Japan Wax — Has declined slightly in price and is now quoted at 17½c @ 18c lb.

Mangrove Bark — Lack of demand during the past month accounts for the considerably lower price quotation of $30 per ton.

Mercury — Once more the market is on an upward trend due to the fact that domestic production is all sold up and therefore not a factor in determining prices. Quotations are now at $123.00 @ $124.00 per flask. The market is firm and demand, at the close of the month especially, has been good. The "Chemist & Druggist," London, remarks that "competition outside of the combine (Spanish-Italian) is quietly growing to more important dimensions, especially in North America, but the fact remains that the filling of the world's requirements, roughly 100,000 bottles, chiefly depends on the combine. By the time new production at the Spanish mines begins to reach full dimensions again, say in another month or two, the unsold surplus available in the chief consuming markets stands a good chance of being considerably reduced, but the question then will probably arise how far the larger European and American importers will feel disposed to place contracts with the Combine. It is, perhaps, as yet premature to dwell on this point, which may easily prove an unsettling factor in the event of the Combine wishing to make large sales rather than accumulate stocks beyond certain dimensions. Obviously no little depends on how far the regulation of the combined output has been effected in line with trade requirements, to enable the Combine to either retain their selling limit or do as they please. Meanwhile a fairly stable market is expected to continue, with spot supplies in strong hands, and a firm policy is likely to be adhered to both by the merchant interests and the producers."

Methanol — Conditions during the past month have remained about the same, and although the market is in little better supply, it is still very firm. December production was 682,480 gallons, as compared with 745,430 gallons in November and 665,166 gallons in December, 1927.

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
				Chloride flake, 375 lb. drs c-1 wks.....ton	.....	36.00	36.00	36.00
37.00	27.00	37.00	37.00	Important shipment....ton	.....	33.00	33.00	33.00
33.00	33.00	33.00	33.00	Fused, imp, 900 lb bbls NY ton	.....	31.00	31.00	31.00
31.00	31.00	31.00	31.00	Fluosilicate, crys, 400 lb bbls wks.....lb.	.10	.10½	.10½	.10
.10½	.10	.10	.10	Oxide, USP, light, 100 lb bbls .....lb.	.....	.42	.42	.42
.42	.42	.42	.42	Heavy, 250 lb bbls.....lb.	.....	.50	.50	.50
.50	.50	.50	.50	Peroxide, 100 lb cs.....lb.	.....	1.25	1.25	1.25
.....	.....	.....	.....	Silicofluoride, bbls.....lb.	.09¾	.10½	.10½	.09¾
.10½	.09¾	.12½	.09¾	Stearate, bbls.....lb.	.25	.26	.26	.25
.25	.23	.23	.23	Manganese Borate, 30%, 200 lb bbls.....lb.	.....	.19	.24	.19
.24	.24	.24	.24	Chloride, 600 lb casks.....lb.	.08	.08½	.08½	.08
.08½	.08	.08	.08	Dioxide, tech (peroxide) drs lb.	.04½	.06	.06	.04½
.....	.....	.05	.04½	Ore, powdered or granular				
.50	.35	.....	.....	75-80%, bbls.....lb.	.03	.03½	.03½	.03
.03½	.03	.03	.03	80-85%, bbls.....lb.	.04	.04½	.04½	.04
.04½	.04	.04	.04	85-88%, bbls.....lb.	.05	.05½	.05½	.05
.05½	.05	.05	.05	Sulfate, 550 lb drs NY.....lb.	.08	.08½	.08½	.08
.07½	.07	.07	.07	Mangrove 55%, 400 lb bbls...lb.	.03½	Nom.	Nom.	.03½
Nom.	.03½	.03½	.03½	Bark, African.....ton	.....	30.00	35.00	30.00
45.00	35.00	39.00	34.00	Marble Flour, bulk.....ton	14.00	15.00	15.00	14.00
12.00	10.00	10.00	10.00	Mercury metal.....75lb flask	123.00	124.00	124.00	120.00
132.00	121.00	129.00	99.00	Meta-nitro-aniline.....lb.	.72	.74	.74	.72
.74	.72	.72	.72	Meta-nitro-para-toluidine 200 lb. bbls.....lb.	1.50	1.55	1.55	1.50
1.80	1.50	1.70	1.70	Meta-phenylene-diamine 300 lb. bbls.....lb.	.84	.90	.90	.84
.94	.90	.90	.90	Meta-toluene-diamine, 300 lb bbls.....lb.	.70	.72	.72	.70
.74	.72	.72	.72					

Methanol

				Methanol, (Wood Alcohol), drs 95%.....gal.	.58	.65	.65	.58
.58	.46	.80	.55	97%, drums c-1.....gal.	.60	.65	.65	.60
.60	.47	.87	.57	Pure, drums 1c-1.....gal.	.65	.68	.68	.65
.63	.44	.....	.....	Synthetic, drums c-1.....gal.	.63	.66	.66	.63
.58	.48	.....	.....	Denat. gre. tanks.....gal.	.60	.62	.62	.60
.75	.45	.80	.75	Methyl Acetate, drums.....gal.	.....	.95	.95	.95
.95	.95	.95	.95	Acetone, 100 gal drums...gal.	.83	.85	.85	.83
.90	.68	.88	.75	Anthraquinone, kegs.....lb.	.85	.95	.95	.85
.95	.85	1.00	.85	Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	.60	.55
.....	.....	.....	.....	Chloride, 90 lb cyl.....gal.	.55	.60	.....	.....
.60	.55	.55	.55	Furoate, 1 lb tins.....lb.	.....	5.00	5.00	5.00
80.00	65.00	.03½	.03½	Mica, dry grd. bags wks.....lb.	65.00	80.00	80.00	65.00
115.00	110.00	.05½	.05½	Wet, ground, bags wks.....lb.	110.00	115.00	115.00	110.00
.....	.....	3.00	3.00	Michler's Ketone, kegs.....lb.	.....	3.00	3.00	3.00
				Monochlorobenzene, drums see, Chorobenzene, mono.....lb.				
.75	.70	.70	.70	Monoethylorthotoluidin, drs. lb.	.70	.75	.75	.70
1.05	1.05	1.05	1.05	Monomethylaniline, 900 lb dr .....lb.	.....	1.05	1.05	1.05
4.20	3.95	3.95	3.95	Monomethylparaminosufate 100 lb drums.....lb.	3.95	4.20	4.20	3.95
.07	.06½	.06½	.06½	Montan Wax, crude, bags....lb.	.06½	.07	.07	.06½
.04½	.04½	.04	.04	Myrobalans 25%, liq bbls....b	.04½	.04½	.04½	.04½
.08½	.08	.08	.08	50% Solid, 50 lb boxes.....lb.	.08	.08½	.08½	.08
50.00	42.00	43.50	41.00	J1 bags.....ton	.....	40.00	43.00	40.00
40.00	32.50	37.00	23.50	J 2 bags.....ton	.....	30.00	40.00	30.00
40.00	32.50	37.00	30.00	R 2 bags.....ton	.....	30.00	34.00	30.00
.18	.18	.21	.18	Naphtha, v. m. & p. (deodorized) bbls.....gal.	.....	.18	.18	.18
.06	.05½	.06	.05½	Naphthalene balls, 250 lb bbls wks.....lb.	.....	.05½	.05½	.05½
.04½	.04½	.04½	.04½	Crushed, chipped bgs wks..lb.	.....	.04½	.04½	.04½
.05	.05	.05	.04½	Flakes, 175 lb bbls wks....lb.	.....	.05	.05	.05
.24	.21	.21	.21	Nickel Chloride, bbls kegs....lb.	.21	.24	.24	.21
.38	.35	.35	.35	Oxide, 100 lb kegs NY.....lb.	.37	.40	.40	.37
.09¾	.09	.09	.08½	Salt bbl. 400 bbls lb NY...lb.	.....	.13	.13	.13
.09	.08¾	.08¾	.08	Single, 400 lb bbls NY.....lb.	.....	.13	.13	.13
1.30	1.25	1.25	1.10	Nicotine, free 40%, 8 lb tins, cases.....lb.	1.25	1.30	1.30	1.25
1.20	.98½	1.10	1.10	Sulfate, 10 lb tins.....lb.	.98½	1.20	1.20	.98½
14.00	13.00	13.00	13.00	Nitre Cake, bulk .....ton	4.50	5.00	5.00	4.50
.10½	.10½	.10½	.09½	Nitrobenzene, redistilled, 1000 lb drs wks.....lb.	.10½	.10½	.10½	.10½
Nom.	.40	.40	.40	Nitrocellulose, regular drums wks.....lb.	.40	Nom.	Nom.	.40
				Low viscosity (soln only)				
Nom.	.55	.55	.55	Grade 1 drums, wks.....lb.	.55	Nom.	Nom.	.55
Nom.	.50	.50	.50	Grade 2 drums, wks.....lb.	.50	Nom.	Nom.	.50
4.00	3.35	3.60	3.35	Nitrogenous Material, bulk..unit	.....	4.00	4.00	4.00
.25	.25	.25	.25	Nitronaphthalene, 550 lb bbls.lb.	.....	.25	.25	.25
.15	.14	.14	.14	Nitrotoluene, 1000 lb drs wks.lb.	.14	.15	.15	.14
Nom.	.25	.25	.25	Nutgalls Aleppy, bags.....lb.	.16	.16½	.16½	.16
.18	.17	.17	.17	Chinese, bags.....lb.	.12	.13	.13	.12
.24	.22	.22	.22	Powdered, bags.....lb.	.22	.24	.24	.22
.03½	.03½	.03½	.03½	Oak, tanks, wks.....lb.	.....	.03½	.03½	.03½
.04½	.04	.04	.04	23-25% liq., 600 lb bbl wk lb.	.04	.04½	.04½	.04
50.00	45.00	45.00	45.00	Oak Bark, ground.....ton	45.00	50.00	50.00	45.00
23.00	20.00	20.00	20.00	Whole.....ton	20.00	23.00	23.00	20.00
.13½	.13	.14½	.13	Orange-Mineral, 1100 lb casks NY.....lb.	.12½	.13½	.13½	.12½
2.25	2.20	2.20	2.20	Orthoaminophenol, 50 lb kgs..lb.	2.20	2.25	2.25	2.20
2.50	2.35	2.50	2.35	Orthoanisidine, 100 lb drs....lb.	2.50	2.60	2.60	2.50
.65	.50	.50	.50	Orthochlorophenol, drums....lb.	.50	.65	.65	.50
.28	.18	.18	.18	Orthocresol, drums.....lb.	.18	.28	.28	.18
.07	.06	.06	.06	Orthodichlorobenzene, 1000 lb drums.....lb.	.07	.10	.10	.07
.35	.32	.32	.32	Orthonitrochlorobenzene, 1200 lb drs wks.....lb.	.30	.33	.33	.30

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Feb. 1929 $1.025

Methyl Acetate — Has been unsettled with sales made at 5c gal. below quoted prices.

Methyl Acetone — Demand has been very slack during the past month and as a result the market has been in easy position.

Phenol — Conditions continue about the same as when last reported, with producers working to capacity to catch up with the demand, whose unanticipated proportions, especially from synthetic resin producers, caught them somewhat unawares. The situation is reported as gradually clearing up.

Resorcinol — Has been quoted at $1.15 @ $1.25 lb., which is a decline of 10c lb. from prices which have obtained for the past two years.

Rosin — The naval stores market has been quiet and inactive generally throughout the past month. The general tendency in the market for rosins has been downward, being from 5c to 50c per unit lower in price than when last reported. An encouraging factor in the situation is the fact that towards the end of the month distinct signs of firmness and strength were becoming evident, and prices recovered somewhat from lower levels which had been prevailing. The number of gum turpentine and rosin producers for the crop year ending March 31, 1928, totaled 1,149 . The output of these establishments for the crop year was 31,549,082 gallons of gum spirits of turpentine and 2,071,813 barrels (500 pounds) of gum rosin. During the calendar year 1927 the production by wood distillation plants of wood turpentine amounted to 4,333,176 gallons, whereas the quantity of wood rosin reached 452,187 barrels (500 pounds). The quantities of these commodities for the crop year ending March 31, 1926, were 3,339,175 gallons of turpentine and 324,504 barrels of rosin.

Shellac — Has been subject to many snifting conditions during the past month. About the middle of the month, the market was quite firm and strong, and prices were higher accordingly. Towards the end of the month, however, the market eased off and prices went lower. This was perhaps a natural reaction made in an effort to encourage demand, which at no time has been very good. Bone dry is now at 61c lb.; garnet at 44c lb.; superfine at 47c lb.; and T. N. at 43c @ 44c lb.

Soda Ash — Although there has been some slackening in demand during the past month, sales continue in good volume and the market is very firm. The falling off in demand is attributed to the fact that consumers anticipated their demands and over-ordered during previous months.

Soda Caustic — Demand here during the past month has been much more

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
				Organic Chemicals			
.18	.17	.13	.13	Orthonitrotoluene, 1000 lb drs wk.....lb.	.17	.18	.18	.17
.90	.85	.85	.85	Orthonitrophenol, 350 lb dr...lb.	.85	.90	.90	.85
.31	.29	.29	.25	Orthotoluidine, 350 lb bbl lc-l lb.	.25	.30	.30	.25
.75	.70	.70	.70	Orthonitroparachlorphenol, tins .....lb.	.70	.75	.75	.70
.17	.16	.16	.16	Osage Orange, crystals.....lb.	.16	.17	.17	.16
.07	.07	.07	.07	51 deg. liquid.....lb.	.07	.07½	.07½	.07
.15	.14½	.14½	.14½	Powdered, 100 lb bags.....lb.	.14½	.15	.15	.14½
.06¾	.06½	.06½	.06½	Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P.....lb.	.06	.06½	.06¾	.06½
.07¾	.07½	.07½	.07½	128-132 deg. M. P.....lb.	.06½	.06¾	.07	.06½
.08½	.08	.08	.08	133-137 deg. M. P.....lb.	.07½	.07¾	.07¾	.07½
.10	.08¾	.08¾	.08¾	138-140 deg. M. P.....lb.	.08	.09	.09	.08
.28	.20½	.29	.26	Para Aldehyde, 110-55 gal drs..lb.	.20½	.23	.28	.20½
1.05	1.00	1.00	1.00	Aminoacetanilid, 100 lb bg..lb.	1.00	1.05	1.05	1.00
1.30	1.25	1.25	1.25	Aminohydrochloride, 100 lb kegs.....lb.	1.25	1.30	1.30	1.25
1.15	1.15	1.15	1.15	Aminophenol, 100 lb kegs..lb.	.....	1.15	1.15	1.15
.65	.50	.50	.50	Chlorophenol, drums.....lb.	.50	.65	.65	.50
.....	.....	.12	.12	Coumarone, 330 lb drums..lb.	.....	.....	.....	.....
2.50	2.25	2.25	2.25	Cymene, refd, 110 gal dr..gal.	2.25	2.50	2.50	2.25
.20	.17	.17	.17	Dichlorobenzene, 150 lb bbls wks.....lb.	.17	.20	.20	.17
.55	.50	.53	.50	Nitroacetanilid, 300 lb bbls.lb.	.50	.55	.55	.50
.59	.48	.52	.52	Nitroaniline, 300 lb bbls wks .....lb.	.48	.59	.49	.48
.32	.32	.32	.32	Nitrochlorobenzene, 1200 lb drs wks.....lb.	.23	.26	.26	.23
2.85	2.75	2.75	2.75	Nitro-orthotoluidine, 300 lb bbls.....lb.	2.75	2.85	2.85	2.75
.55	.50	.50	.50	Nitrophenol 185 lb bbls....lb.	.50	.55	.55	.50
.94	.92	.92	.92	Nitrosodimethylaniline, 120 lb. bbls.....lb.	.92	.94	.94	.92
.30	.30	.30	.25	Nitrotoluene, 350 lb bbls....lb.	.....	.30	.30	.30
1.20	1.15	1.20	1.15	Phenylenediamine, 350 lb bbls .....lb.	1.15	1.20	1.20	1.15
.41	.40	.40	.40	Tolueneulfonamide, 175 lb bbls.....lb.	.70	.75	.75	.70
.22	.20	.20	.18	Toluenesulfonchloride, 410 lb bbls wks.....lb.	.20	.22	.22	.20
.42	.40	.45	.38	Toluidine, 350 lb bbls wk...lb.	.40	.42	.42	.40
.25	.20	.21	.21	Paris Green, Arsenic Basis 100 lb kegs.....lb.	.....	.25	.25	.25
.23	.17	.19	.19	250 lb kegs.....lb.	.....	.23	.23	.23
.....	.....	.25	.25	Persian Berry Ext., bbls.....lb.	.25	Nom.	.25	.25
.03	.02½	.02½	.02½	Petrolatum, Green, 300 lb bbl.lb.	.02	.02½	.02½	.02
.13	.20	.18	.16	Phenol, 250-100 lb drums.....lb.	.13½	.16	.16	.13½
1.35	1.35	1.35	1.28	Phenyl - Alpha - Naphthylamine, 100 lb kegs.....lb.	.....	1.35	1.35	1.35
				Phosphate			
3.15	3.00	3.00	3.00	Phosphate Rock, f.o.b. mines Florida Pebble, 68% basis..ton	3.00	3.15	3.15	3.00
3.65	3.50	3.50	3.50	70% basis.....ton	3.75	4.00	4.00	3.50
4.15	4.00	4.00	3.85	72% basis.....ton	4.25	4.50	4.50	4.00
5.00	5.00	5.35	5.00	75-74% basis.....ton	5.25	5.50	5.50	5.00
5.75	5.75	5.75	5.60	75% basis.....ton	.....	5.75	5.75	5.75
6.25	6.25	6.25	6.00	77-76% basis.....ton	.....	6.25	6.25	6.25
5.00	5.00	5.50	5.00	Tennessee, 72% basis.....ton	.....	5.00	5.00	5.00
.40	.35	.35	.35	Phosphorous Oxychloride 175 lb cyl.....lb.	.35	.40	.40	.35
.65	.60	.65	.60	Red, 110 lb cases.....lb.	.55	.60	.60	.55
.32	.32	.32	.32	Yellow, 110 lb cases wks..lb.	.....	.32	.32	.32
.46	.46	.46	.46	Sesquisulfide, 100 lb cs.....lb.	.....	.44	.46	.44
.....	.....	.35	.35	Trichloride, cylinders.....lb.	.....	.35	.35	.35
.20	.18	.18	.18	Phthalic Anhydride, 100 lb bbls wks.....lb.	.18	.20	.20	.18
45.00	37.00	40.00	37.00	Pigments Metallic, Red or brown bags, bbls, Pa. wks.....ton	37.00	45.00	45.00	37.00
.64	.63	.63	.63	Pine Oil, 55 gal drums or bbls Destructive dist.....lb.	.63	.64	.64	.63
10.60	8.00	8.00	8.00	Prime bbls.....bbl.	8.00	10.60	10.60	8.00
.70	.70	.70	.66	Steam dist. bbls.....gal.	.65	.70	.70	.65
45.00	40.00	40.00	40.00	Pitch Hardwood,..... wks.....ton	40.00	45.00	45.00	40.00
3.30	3.30	3.30	3.30	Plaster Paris, tech, 250 lb bbls .....bbl.	3.30	3.50	3.50	3.30
				Potash			
.07½	.07½	.07½	.07½	Potash, Caustic, wks.....lb.	.....	.07½	.07½	.07½
.07½	.07½	.07½	.07½	Imported casks c-l.....lb.	.....	.07½	.07½	.07½
9.00	9.00	9.00	9.00	Potash Salts, Rough Kainit 12.4% basis bulk.....ton	.....	9.00	9.00	9.00
9.50	9.50	9.50	9.50	14% basis.....ton	.....	9.50	9.50	9.50
12.40	12.40	12.40	12.40	Manure Salts..... 20% basis bulk.....ton	.....	12.40	12.40	12.40
18.75	18.75	18.75	18.75	30% basis bulk.....ton	.....	18.75	18.75	18.75
36.40	36.40	36.40	36.40	Potassium Muriate, 80% basis bags.....ton	.....	36.40	36.40	36.40
27.00	27.00	27.00	27.00	Pot. & Mag. Sulfate, 40% basis bags.....ton	.....	27.00	27.00	27.00
47.30	47.30	47.30	47.30	Potassium Sulfate, 90% basis bags.....ton	.....	47.30	47 30	47.30
.09½	.09	.09	.09	Potassium Bicarbonate, USP, 320 lb bbls.....lb.	.13	.14	.14	.13
.09¼	.08¼	.08¼	.08	Bichromate Crystals, 725 lb casks.....lb.	.09	.09¼	.09¼	.09
.12¼	.12	.12	.11	Powd., 725 lb cks wks....lb.	.13	.13¼	.13¼	.13

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Prices Current and Comment

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pronounced than that for ash. In some quarters it is reported that there is a marked shortage. This is in spite of increased production and merely means that consumption too is increasing rapidly, due chiefly to the growing rayon industry. Prices are firm and the market has a pronounced upward tendency, although there is little or no possibility of price advances.

Sodium Nitrate — Has continued at quoted prices of $2.22½ per 100 lbs., with the market firm and improving at that figure. A summary of the world position as of January 31 indicates a supply of 1,103,500 tons in Europe and Egypt; 287,000 tons in the United States; 43,000 tons in other countries; and 712,000 tons in Chile; a total supply of 2,145,500 tons. Shipments during January were as follows: to Europe, 283,000 tons; United States Atlantic, 134,000 tons; Japan, 8,400 tons; Hawaii, 5,700 tons; United States Pacific, 5,400 tons; others 2,900 tons. Production during January amounted to 270,217 tons, as compared with 238,976 tons in January 1928. Chilean nitrate production in 1928 surpassed the peak production of 1917 resulting from war demands, by 100,000 tons, according to the Department of Commerce. The output reached 3,163,000 metric tons, 100,000 tons more than in 1917, the previous best year for the industry when demand was abnormal due to unusually large military requirements. December nitrate of soda output was high; it totaled 293,600 tons compared with 23,380 tons in December, 1927. Exports, also high, amounted to 342,100 tons compared with 302,600 the same month in 1927. World stocks of nitrate of soda were large at the end of 1926—2,133,200 metric tons. It now seems almost certain that the American producer will rejoin the centralized selling organization.

Sodium Sulfate — Combined production of salt cake, Glauber's salt, refined, and acid sulfate was 371,756 tons in 1927 as compared with 373,305 tons in 1925, according to the Department of Commerce. Statistics on the various salts compare as follows: salt cake, production 1925—189,293 tons, production 1927, 202,636 tons, imports 1927,—11,177 tons, imports 11 months 1928—25,360 tons; Glauber's salt, production 1925—57,622 tons, 1927—24,420 tons, imports 1927—2,808 tons, 1928 (11 mon.) 1,198 tons; sodium sulfate refines production, 1925—2,100 tons, 1927—2,688 tons, imports—1927—2,569 tons, 1928 (11 mon.) 2,863 tons; bisulfate, production, 1925—124,290 tons, 1927—142,012 tons.

Sulfur — Production of sulphur in this country in 1928 amounted to 1,981,873 long tons, compared with 2,111,618 tons in 1927, a decrease of six per cent. The

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
.17	.16	.16	.16	Binoxiate, 300 lb bbls....lb.	.16	.17	.17	.16
.30	.30	.30	.30	Bisulfate, 100 lb kegs....lb.	.....	.30	.30	.30
.05½	.05½	.05½	.05½	Carbonate, 80-85% calc. 800 lb casks....lb.	.05½	.05½	.05½	.05⅝
.09	.06½	.08½	.08½	Chlorate crystals, powder 112 lb keg wks....lb.	.08½	.09	.09	.08½
.08½	.07½	.08½	.08½	Imported 112 lb kegs NY....lb.	.07½	.07½	.07½	.07½
.05½	.05⅝	.05⅝	.05⅝	Chloride, crys bbls....lb.	.05½	.05½	.05½	.05⅝
.28	.27	.27	.27	Chromate, kegs....lb.	.27	.28	.28	.27
.57½	.55	.55	.55	Cyanide, 110 lb. cases....lb.	.55	.57½	.57½	.55
.12	.11½	.11½	.11½	Metabisulfite, 300 lb. bbl...lb.	.11½	.12	.12	.11½
.17	.16	.16	.16	Oxalate, Neut. 225 lb. bbls.lb.	.16	.17	.17	.16
.12	.11	.11	.11	Perchlorate, casks wks....lb.	.11	.12	.12	.11
.15½	.15	.15½	.14½	Permanganate, USP, crys 500 & 100 lb drs wks....lb.	.16	.16½	.16½	.16
.38	.37	.39	.37½	Prussiate, red, 112 lb keg...lb.	.38	.40	.40	.38
.18½	.18	.18	.18	Yellow, 500 lb casks....lb.	.18½	.21	.21	.18½
.51	.51	.51	.51	Tartrate Neut, 100 lb keg..lb.	.....	.21	.51	.51
.25	.25	.25	.25	Titanium Oxalate, 200 lb bbls ....lb.	.....	.25	.25	.25
.....	.....	.....	.....	Propyl Furoate, 1 lb tins....lb.	.....	5.00	5.00	5.00
.05	.04	.04	.04	Pumice Stone, lump bags....lb.	.04	.05	.05	.04
.06	.04½	.04½	.04½	250 lb bbls....lb.	.04½	.06	.06	.04½
.03	.02½	.02½	.02½	Powdered, 350 lb bags....lb.	.02½	.03	.03	.02½
.03½	.03½	3.75	3.75	Putty, commercial, tubs..100 lb.	.....	.03½	.03½	.03½
.05½	.05½	5.50	5.50	Linseed Oil, kegs....100 lb.	.....	.05½	.05½	.05½
1.50	1.50	3.00	1.50	Pyridine, 50 gal drums....gal.	.....	1.75	1.75	1.50
.13¼	.13	.13	.12	Pyrites, Spanish cif Atlantic ports bulk....unit	.13	.13¼	.13¼	.13
.04	.03	.03	.03	Quebracho, 35% liquid tks....lb.	.03½	.04	.04	.03½
.04½	.03½	.03½	.03½	450 lb bbls c-l....lb.	.03½	.04½	.04½	.03½
.05½	.04	.04	.04	35% Bleaching, 450 lb bbl .lb.	.04½	.05½	.04½	.05½
.05⅜	.05	.05	.04⅜	Solid, 63%, 100 lb bales cif..lb.	.05½	.05½	.05⅜	.05½
.05⅜	.05	.05	.05	Clarified, 64%, bales....lb.	.....	.05⅜	.05⅜	.05⅜
.06	.05½	.06½	.06½	Quercitron, 51 deg liquid 450 lb bbls....lb.	.05½	.06	.06	.05½
.13	.10	.10	.10	Solid, 100 lb boxes....lb.	.10	.13	.13	.10
14.00	14.00	14.00	14.00	Bark, Rough....ton	.....	14.00	14.00	14.00
35.00	34.00	34.00	34.00	Ground....ton	34.00	35.00	35.00	34.00
.46	.45	.45	.45	R Salt, 250 lb bbls wks....lb.	.45	.46	.46	.45
.....	.....	.18	.18	Red Sanders Wood, grd bbls..lb.	.....	.18	.18	.18
1.35	1.25	1.25	1.25	Resorcinol Tech, cans....lb.	1.15	1.25	1.25	1.15
.57	.57	.67	.57	Rosin Oil, 50 gal bbls, first run ....gal.	.....	.62	.62	.57
.62	.62	.72	.62	Second run....gal.	.....	.64	.64	.62

Rosin

				Rosins 600 lb bbls 280 lb...unit				
9.75	8.20	13.00	8.50	B	.....	8.25	8.30	8.25
9.80	8.25	13.00	8.50	D	.....	8.55	8.65	8.55
9.95	8.60	13.15	8.50	E	.....	8.80	9.10	8.80
10.10	8.65	13.20	8.50	F	.....	9.30	9.30	9.20
10.10	8.75	13.25	8.50	G	.....	9.30	9.30	9.25
10.10	8.75	13.30	8.50	H	.....	9.37½	9.37½	9.35
10.15	8.80	13.35	8.55	I	.....	9.37½	9.37½	9.35
10.15	8.85	14.80	8.65	K	.....	9.45	9.55	9.45
10.30	8.85	15.00	8.80	M	.....	9.63	9.85	9.63
11.00	9.15	15.85	9.15	N	.....	10.10	10.30	10.10
11.65	10.15	16.60	10.50	WG	.....	11.15	11.30	11.15
12.65	10.40	18.55	12.00	WW	.....	12.25	12.30	12.25
30.00	24.00	24.00	24.00	Rotten Stone, bags mines....ton	24.00	30.00	30.00	24.00
.08	.07	.07	.07	Lump, imported, bbls....lb.	.07	.08	.08	.07
.12	.09	.09	.09	Selected bbls....lb.	.09	.12	.12	.09
.05	.02	.02	.02	Powdered, bbls....lb.	.02	.05	.05	.02
.05	.04½	.04½	.04½	Sago Flour, 150 lb bags....lb.	.04½	.05	.05	.04½
.....	.....	.90	.90	Sal Soda, bbls wks....100 lb.	.....	1.00	1.00	1.00
20.00	19.00	19.00	19.00	Salt Cake, 94-96% c-1 wks. .ton	19.00	20.00	20.00	19.00
17.00	15.00	15.00	15.00	White, 87% wks....ton	15.00	17.00	17.00	15.00
.06½	.06½	.06½	.06½	Saltpetre, double refd granular 450-500 lb bbls....lb.	.06½	.06½	.06½	.06½
.01½	.01½	.01½	.01½	Satin, White, 500 lb bbls....lb.	.....	.01½	.01½	.01½
.62½	.49	.66	.47	Shellac Bone dry bbls....lb.	.....	.61	.61	.59
.55	.45	.57	.41	Garnet, bags....lb.	.....	.44	.45	.44
.58	.47	.65	.40	Superfine, bags....lb.	.....	.47	.47	.47
.55	.42	.37	.57	T. N. bags....lb.	.42	.44	.44	.43
.57	.53	.50	.50	Schaeffer's Salt, kegs....lb.	.53	.57	.57	.53
11.00	8.00	6.00	6.00	Silica, Crude, bulk mines....ton	8.00	11.00	11.00	8.00
30.00	22.00	15.00	15.00	Refined, floated bags....ton	22.00	30.00	30.00	22.00
.....	.....	32.00	32.00	Air floated bags....ton	.....	32.00	32.00	32.00
40.00	32.00	55.00	55.00	Extra floated bags....ton	32.00	40.00	40.00	32.00
22.00	15.00	15.00	15.00	Soapstone, Powdered, bags f. o. b. mines....ton	15.00	22.00	22.00	15.00

Soda

				Soda Ash, 58% dense, bags c-l				
1.40	1.40	1.32½	1.32½	wks....100 lb.	.....	1.40	1.40	1.40
2.29	2.40	2.14	2.04	58% light, bags....100 lb.	.....	1.34½	1.34½	1.34½
1.32½	1.32½	1.32½	1.32½	Contract, bags c-l wks.100 lb.	.....	1.32	1.32	1.32
4.21	4.16	4.16	4.06	Soda Caustic, 76% grnd & flake drums....100 lb.	.....	3.35	3.35	3.35
3.91	3.76	3.76	3.66	76% solid drs....100 lb.	.....	2.95	2.95	2.95
3.00	3.00	3.00	3.00	Contract, c-l wks....100 lb.	.....	2.90	2.90	2.90
.05	.04½	.04½	.04½	Sodium Acetate, crystals, 450 lb. bbls wks....lb.	.05	.06	.06	.05
.....	.....	.19	.18	Arsenate, drums....lb.	.18	.19	.19	.18
.....	.....	1.00	1.00	Arsenite, drums....gal.	1.00	1.50	1.50	1.00
2.41	2.41	2.41	2.41	Bicarb, 400 lb bbl NY..100 lb.	.....	2.41	2.41	2.41

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shipments in 1928 were record-breaking, 2,082,924 tons, valued at approximately $37,500,000, compared with 2,072,109 tons, valued at approximately $38,300,000 in 1927. Stocks on hand at the mines decreased approximately 100,000 tons in 1928 and totaled about 2,000,000 tons at the end of the year, the smallest since 1921.

Turpentine — Has been quiet and inactive during the past month with some sign of firmer conditions existing as the month closed. Quotations are at 57½c @ 62½c gal. for spirits and 55c gal. for steam distilled. The Department of Commerce announces that, distillation of turpentine and rosin from crude gum reported products for the crop year ended March 31, 1928, valued at $39,902,971, a decrease of 5.8 per cent. as compared with $42,364,413 for the crop year ended March 31, 1926, the last preceding census year. These establishments reported a total production of 31,549,082 gallons of turpentine and 2,071,813 barrels (of 500 pounds) of rosin. In addition, considerable quantities of turpentine and rosin are made by the distillation of wood, both by the steam-solvent process and by the destructive process. During the calendar year 1927 the production by these processes amounted to 4,390,796 gallons of turpentine and 452,167 barrels of rosin. These quantities represent increases of 31.5 per cent. and 39.3 per cent., respectively, as compared with the corresponding figures for the crop year 1925-1926.

OILS AND FATS

Chinawood Oil — The proposed export tax which was reported here last month and which caused the unusually high prices of last month, never did go into effect and as a result prices are at a more normal level now. Quotations on tanks at the Coast are now at 12½c @ 12¾c lb., while the barrels price in New York is at 14½c @ 14¾c lb. The explanation of the vagaries of this tax is contained in the following report of the Department of Commerce: The Hankow Surtax Bureau in an order issued January 16, 1929, placed an export tax of $2 per picul on oil exported from Hankow. The new tax did not remain in effect, however, as a review of the new export tax caused the Minister of Affairs of the Chinese Government to publish a decree, on or about January 18, rescinding the new tax. Total January exports from Hankow reached 37,069 barrels (14,271,715 pounds) of which the United States received 32,000 barrels (12,323,465 pounds) and the remainder

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
.07	.06½	.06½	.06½	Bichromate, 500 lb cks wks.lb.	.07½	.07¾	.07¼	.07½
.04	.04	.08½	.08½	Bisulfite, 500 lb bbl wks....lb.	.....	.04	.04	.04
1.35	1.30	1.30	1.30	Carb. 350 lb bbls NY..100 lb.	1.30	1.35	1.35	1.30
.06¾	.05¾	.06½	.06½	Chlorate, 112 lb kegs wks..lb.	.06½	.07	.07	.06½
13.00	12.00	12.00	12.00	Chloride, technical.....ton	12.00	13.00	13.00	12.00
.20	.20	.20	.20	Cyanide, 96-98%, 100 & 250 lb drums wks.....lb.	.18	.20	.20	.18
.09	.08¾	.08¾	.08¾	Fluoride, 300 lb bbls wks...lb.	.08¾	.09	.09	.08¾
.24	.22	.22	.22	Hydrosulfite, 200 lb bbls f. o. b. wks.....lb.	.22	.24	.24	.22
.05	.05	.05	.05	Hypochloride solution, 100 lb cbys.....lb.	.....	.05	.05	.05
3.05	2.65	2.65	2.65	Hyposulfite, tech, pea cyrs 375 lb bbls wks.....100 lb.	2.65	3.05	3.05	2.65
2.65	2.40	2.40	2.40	Technical, regular crystals 375 lb bbls wks....100 lb.	2.40	2.65	2.65	2.40
.45	.45	.70	.45	Metanilate, 150 lb bbls.... lb.	.....	.45	.45	.45
.....	.....	.02½	.02½	Monohydrate, bbls.....lb.	.....	.02½	.02½	.02½
.57	.55	.55	.55	Naphthionate, 300 lb bbl...lb.	.55	.57	.57	.55
2.45	2.12½	2.67	2.25	Nitrate, 92%, crude, 200 lb bags c-1 NY.....100 lb.	.....	2.22½	2.22½	2.22½
.08¼	.07½	.08¾	.08	Nitrite, 500 lb bbls spot....lb.	.07½	.08	.08	.07½
.27	.25	.25	.25	Orthochlorotoluene, sulfonate, 175 lb bbls wks.....lb.	.25	.27	.27	.25
.23	.20	.20	.20	Oxalate Neut, 100 lb kegs..lb.	.37	.42	.42	.37
3.90	3.90	3.90	3.90	Paratoluene, tri-sodium, tech. 100 lb bbls c-1....100 lb.	.....	3.90	3.90	3.90
.09	.08	.08	.08	Sulfonate, 175 lb bbls....lb.	.08	.09	.09	.08
.22	.21	.21	.21	Perborate, 275 lb bbls.....lb.	.18	.20	.22	.18
3.55	3.25	3.25	3.25	Phosphate, di-sodium, tech. 310 lb bbls.....100 lb.	3.25	3.55	3.55	3.25
.....	.....	.....	.....	tri-sodium, tech, 325 lb bbls.....100 lb.	3.90	4.00	4.00	3.90
.72	.69	.69	.69	Picramate, 100 lb kegs.....lb.	.69	.72	.72	.69
.12½	.12	.12	.11	Prussiate, Yellow, 350 lb bbl wks.....lb.	.12	.12½	.12½	.12
.14	.13½	.13½	.13½	Pyrophosphate, 100 lb keg..lb.	.15	.20	.20	.15
1.45	1.20	1.20	1.20	Silicate, 60 deg 55 gal drs, wks .....100 lb.	.....	1.65	1.65	1.65
1.10	.85	.85	.85	40 deg 55 gal drs, wks .....100 lb.	.70	.80	.80	.70
.05	.05	.04½	.04½	Silicofluoride, 450 lb bbls NY .....lb.	.05	.05½	.05½	.05
.49	.48½	.48½	.48½	Stannate, 100 lb drums....lb.	.42	.43	.43	.42
.29	.18	.20	.20	Stearate, bbls.....lb.	.25	.29	.29	.25
.18	.16	.16	.16	Sulfanilate, 400 lb bbls....lb.	.16	.18	.18	.16
.02½	.02½	.02½	.02½	Sulfate Anhyd, 550 lb bbls c-1 wks.....lb.	.02½	.02¾	.02¾	.02½
.02¾	.02½	.02½	.02½	Sulfide, 30% crystals, 440 lb bbls wks.....lb.	.02½	.02¾	.02¾	.02½
.04	.03½	.03½	03½	62% solid, 650 lb drums 1c-1 wks.....lb.	.03½	.04	.04	.03½
.03½	.03½	.03¾	.03½	Sulfite, crystals, 400 lb bbls wks.....lb.	.03½	.03½	.03½	.03¼
.50	.40	.40	.40	Sulfocyanide, bbls.....lb.	.66	.76	.76	.66
.85	.80	.85	.80	Tungsten, tech, crystals, kegs .....lb.	.80	.85	.85	.80
.40	.35	.40	.35	Solvent Naphtha, 110 gal drs wks.....gal.	.35	.40	.40	.35
.01¾	.01¾	.01¾	.01¾	Spruce, 25% liquid, bbls.....lb.	.....	.01¾	.01¾	.01¾
.01	.01	.01	.01	25% liquid, tanks wks.....lb.	.....	.01	.01	.01
.02½	.02	.02	.02	50% powd, 100 lb bag wks lb.	.02	.02½	.02½	.02
4.42	3.07	3.22	3.07	Starch, powd., 140 lb bags .....100 lb.	3.82	4.02	4.02	3.82
4.32	2.97	3.12	2.97	Pearl, 140 lb bags.....100 lb.	3.72	3.92	3.92	3.72
.06¾	.05¾	.06	.04¾	Potato, 200 lb bags.....lb.	.05¾	.06¼	.06¼	.05¾
.06¾	.05¾	.06½	.06½	Imported bags.....lb.	.05¾	.06¼	.06¼	.05¼
.08½	.08	.08	.06	Soluble.....lb.	.08	.08½	.08½	08
.10	.09½	.09½	.09	Rice, 200 lb bbls.....lb.	.09½	.10	.10	.09½
.07	.06½	.06½	.06½	Wheat, thick bags.....lb.	.06½	.07	.07	.06½
.10	.09½	.09½	.09½	Thin bags.....lb.	.09½	.10	.10	.09½
.07½	.07½	.07½	.07½	Strontium carbonate, 600 lb bbls wks.....lb.	.07½	.07½	.07½	.07½
.09	.08¾	.08¾	.08	Nitrate, 600 lb bbls NY....lb.	.09	.09½	.09½	.08¾
.....	.....	.....	.....	Peroxide, 100 lb drs.....lb.	.....	1.25	1.25	1.25
				Sulfur				
2.05	2.05	2.05	2.05	Sulfur Brimstone, broken rock, 250 lb bag c-1.....100 lb.	.....	2.05	2.05	2.05
19.00	18.00	18.00	18.00	Crude, f. o. b. mines.....ton	18.00	19.00	19.00	18.00
2.40	2.40	2.40	2.40	Flour for dusting 99¼%, 100 lb bags c-1 NY....100 lb.	.....	2.40	2.40	2.40
2.50	2.50	2.50	2.50	Heavy bags c-1.....100 lb.	.....	2.50	2.50	2.50
3.45	3.45	3.45	3.45	Flowers, 100%, 155 lb bbls c-1 NY.....100 lb.	.....	3.45	3.45	3.45
2.85	2.65	2.65	2.65	Roll, bbls 1c-1 NY.....100 lb.	2.65	2.85	2.85	2.65
.05½	.05	.05	.05	Sulfur Chloride, red, 700 lb drs wks.....lb.	.05	.05½	.05½	.05
.04½	.03½	.03¾	.03¼	Yellow, 700 lb drs wks.....lb.	.03¼	.04½	.04½	.03½
.08½	.08	.08	.08	Sulfur Dioxide, 150 lb cyl....lb.	.08	.08½	.08½	.08
.19	.17	.17	.17	Extra, dry, 100 lb cyl.....lb.	.17	.19	.19	.17
.65	.10	.65	.65	Sulfuryl Chloride, 600 lb dr...lb.	.10	.65	.65	.10
.11½	.11	.11	.11	Stainless, 600 lb bbls....lb.	.11	.11½	.11½	.11
.06	.05½	.05	.05	Extract, 450 lb bbls.....lb.	.05½	.06	.06	.05½
130.00	130.00	130.00	130.00	Sicily Leaves, 100 lb bg...ton	.....	130.00	130.00	130.00
72.00	72.00	80.00	72.00	Ground shipment.....ton	.....	72.00	72.00	72.00
60.00	55.00	55.00	55.00	Virginia, 150 lb bags.....ton	55.00	60.00	60.00	55.00
15.00	12.00	12.00	12.00	Talc, Crude, 100 lb bgs NY...ton	12.00	15.00	15.00	12.00
18.00	16.00	16.00	16.00	Refined, 100 lb bgs NY..ton	16.00	18.00	18.00	16.00
35.00	30.00	30.00	30.00	French, 220 lb bags NY...ton	20.00	25.00	25.00	20.00
45.00	38.00	38.00	38.00	Refined, white, bags....ton	38.00	45.00	45.00	38.00
50.00	40.00	40.00	40.00	Italian, 220 lb bags NY...ton	40.00	50.00	50.00	40.00
55.00	50.00	50.00	50.00	Refined, white, bags....ton	50.00	55.00	55.00	50.00

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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1928 $1.047 - Feb. 1929 $1.025

going to Europe. Total imports of wood oil into the United States during the quarter ended December 31, 1928 amounted to 25,504,635 pounds. Consumption in this country during the same period amounted to 22,834,726 pounds, and warehouse stocks on December 31, to 25,424,215 pounds.

Coconut Oil — Has been inactive and dull during the past month. The only changes of any kind are in the Ceylon grade which is quoted at somewhat lower prices. Barrels New York are at 9c @ 9¼c lb., while tanks are at 8¼c @ 8⅜c lb. Imports of Coconut oil during the quarter ended December 31, 1928 amounted to 97,649,657 pounds. Production of crude coconut or copra oil during that period amounted to 88,119 594 pounds and consumption 156,664,851 pounds, leaving warehouse stocks at the end of the period at 101,602,024 pounds. Production of refined oil amounted to 86,155,552 pounds, and consumption to 75,083,597 pounds, leaving warehouse stocks on December 31 of 14,444,990 pounds.

Corn Oil — Advancing prices in the grain market have again lead to higher prices on all grades of corn oil. Crude oil is at 10¾c lb. in barrels and 9½c lb. in tanks at the mills, while refined oil is at 11¾c lb. in barrels and 11c lb. in tanks. Domestic production of crude oil during the quarter ended December 31, 1928, amounted to 32,736,618 pounds, and consumption during the same period, to 36, 879,378 pounds, with warehouse stocks on December 31, amounting to 16,547,885 pounds. Production of refined oil during the same period amounted to 28,873,563 pounds, consumption to 4,337,222 pounds, and warehouse stocks on December 31, to 11,157,229 pounds.

Cottonseed Oil — PSY has advanced during the past month and is quoted at 10¾c lb., while trading in futures averages about the same price level. Crude oil has remained unchanged at 9c lb. Domestic production of crude oil amounted to 772, 008,043 lbs., during the quarter ended December 31, and consumption to 698, 801,104 pounds, with warehouse stocks at the end of the period were 133,836,969 pounds. Production of refined oil amounted to 645,352,360 pounds, consumption to 319,289,527 pounds, with warehouse stocks December 31 of 431,693,697 pounds. Exports of crude oil for the quarter amounted to 10,314,813 pounds and exports of refined to 2,344,882 pounds. Production of crude oil for six months ended January 31, amounted to 1,157,382,415 pounds against 1,118,997,136 pounds a year ago; while production of refined amounted to 932,722,545 pounds, against

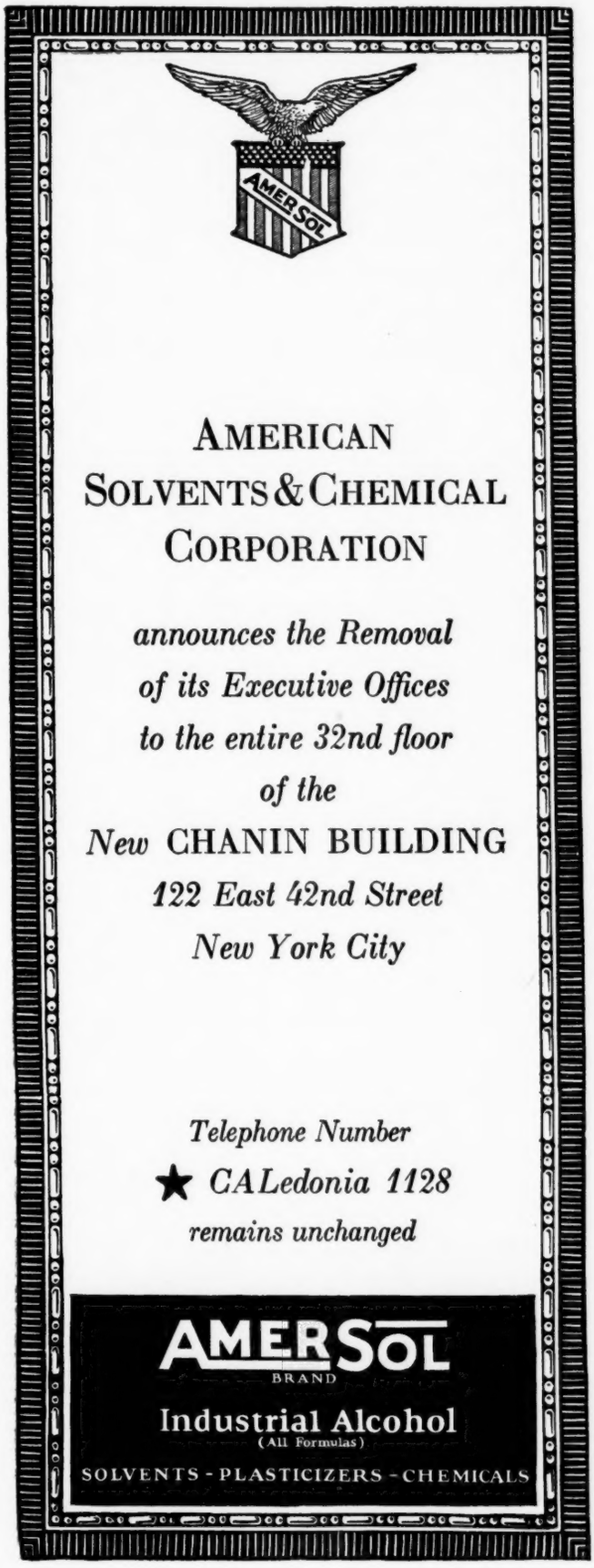
1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
5.10&10	4.65&10	4.85	4.00	Tankage Ground NY.....unit	..... 4.75&10	4.75&10	4.75&10
4.80&10	3.90&10	5.25	3.75	High grade f.o.b. Chicago.unit	.....4.00&1.00	4.80&10	4.00&100
5.00&10	4.60&10	5.25	4.00	South American cif.....unit	..... 4.80&10	4.80&10	4.80&10
.05	.04½	.04½	.04½	Tapioca Flour, high grade bgs..lb.	.04½	.05	.05	.04½
.04	.03½	.03½	.03½	Medium grade, bags.....lb.	.03½	.04	.04	.03½
.27	.26	.26	.26	Tar Acid Oil, 15%,drums....gal.	.26	.27	.27	.26
.30	.29	.29	.29	25% drums.....gal.	.29	.30	.30	.29
.08	.07	.07	.07	Coke Oven, tanks wks.....lb.	.07	.08	.08	.07
13.50	13.50	16.00	13.50	Kiln Burnt, bbl.....bbl.	.....	13.50	13.50	13.50
15.00	13.50	18.50	13.50	Retort, bbls.....bbl.	13.50	15.00	15.00	13.50
1.75	1.15	1.15	1.15	Terra Alba Amer. No. 1, bgs or bbls mills.....100 lb.	1.15	1.75	1.75	1.15
2.00	1.50	1.50	1.50	No. 2 bags or bbls...100 lb	1.50	2.00	2.00	1.50
.02½	.02	2.00	2.00	Imported bags.....100 lb	.02	.02½	.02½	.02
.....	.....	.....	.....	Tetrachlorethane, 50 gal dr...lb	.09	.09½	.09½	.09
.20	.20	.20	.20	Tetralene, 50 gal drs wks.....lb.	.....	.20	.20	.20
.24	.22	.22	.22	Thiocarbanilid, 170 lb bbl....lb.	.22	.24	.24	.22
.17½	.14½	.20½	.17½	Tin Bichloride, 50% soln, 100 lb bbls wks.....lb.	.....	.14½	.14½	.14½
.41½	.36½	.48	.41½	Crystals, 500 lb bbls wks...lb.	.....	.36½	.36½	.36½
.58	.48	.71½	.58	Metal Straits NY.....lb.	.....	.48	.48	.48
.75	.53	.75	.70	Oxide, 300 lb bbls wks.....lb.	.....	.56	.56	.53
.35½	.30½	.48	.35½	Tetrachloride, 100 lb drs wks. .....lb.	.....	.30½	.30½	.30½
.40	.40	.40	.40	Titanium Oxide200 lb bbl....lb.	.....	.40	.40	.40
.14	.13½	.13½	.13½	Pigment, b,bls wks.....lb.	.13½	.14	.14	.13½
.45	.40	.40	.40	Toluene, 110 gal drs wks.....lb.	.....	.45	.45	.45
.45	.35	.35	.35	8000 gal tank cars wks.....lb.	.....	.40	.40	.40
.94	.90	.90	.90	Toluidine, 350 lb bbls.....lb.	.90	.94	.94	.90
.32	.31	.31	.31	Mixed, 900 lb drs wks.....lb.	.31	.32	.32	.31
.90	.85	.85	.85	Toner Lithol, red, bbls.....lb.	.85	.90	.90	.85
.80	.70	.75	.75	Para, red, bbls.....lb.	.70	.75	.75	.70
1.80	1.70	1.75	1.75	Toluidine.....lb.	1.50	1.55	1.55	1.50
3.90	3.60	3.60	3.60	Triacetin, 50 gal drs wks.....lb.	3.60	3.90	3.90	3.60
.....	.....	.....	.....	Trichlorethylene, 50 gal dr...lb.	.10	.10½		
.....	.....	.....	.....	Triethanolamine, 50 gal drs...lb.	.55	.60	.60	.55
.50	.36	.36	.36	Tricresyl Phosphate, drs.....lb.	.33	.45	.45	.33
.73	.69	.70	.69	Triphenylguanidine.....lb.	.60	.70	.70	.60
.75	.70	.70	.70	Phosphate, drums.....lb.	.70	.75	.75	.70
3.00	2.50	2.50	2.50	Tripoli, 500 lb bbls.....100 lb.	1.75	2.00	2.00	1.75
.66½	.50½	.86	.53½	Turpentine Spirits, bbls.....gal.	.57½	.62½	.65	.57½
.59	.46	.76	.46	Wood Steam dist. bbls....gal.	.....	.55	.57	.55
.20	.18	.18	.18	Urea, pure, 112 lb cases.....lb.	.20	.30	.30	.20
76.00	55.00	70.00	66.00	Valonia Beard, 42%, tannin bags.....ton	.....	52.00	55.00	52.00
55.00	58.00	49.50	39.00	Cups, 30-31% tannin.....ton	.....	35.00	35.00	35.00
64.00	45.00	68.00	43.00	Mixture, bark, bags.....ton	.....	42.00	43.00	42.00
2.10	1.75	1.95	1.55	Vermillion, English, kegs....lb..	2.00	2.05	2.05	2.00
.....	.....	.....	.....	Vinyl Chloride, 16 lb cyl.....lb.	.....	1.00	1.00	1.00
76.00	49.75	59.00	49.50	Wattle Bark, bags.....ton	.....	44.50	49.75	44.50
.06½	.05½	.05½	.05½	Extract 55%, double bags ex-dock.....lb.	.....	.06½	.06½	.06½
1.25	1.25	1.25	1.25	Whiting, 200 lb bags, c-1 wks .....100 lb.	.....	1.25	1.25	1.25
13.00	13.00	13.00	13.00	Alba, bags c-1 NY.....ton	.....	13.00	13.00	13.00
1.35	1.35	1.35	1.35	Gilders, bags c-1 NY...100 lb.	.....	1.35	1.35	1.35

Zinc

.05½	5.85	.06½	.06½	Zinc Ammonium Chloride powd., 400 lb bbls.....lb.	5.25	5.75	5.75	5.25
.10	.09½	.09½	.09½	Carbonate Tech, bbls NY..lb.	.10½	.11	.11	.10½
.06	.06	.06	.06	Chloride Fused, 600 lb drs. wks.....lb.	.05½	.06	.06	.05½
.06½	.06½	.06½	.06½	Gran., 500 lb bbls wks.....lb.	.06½	.06½	.06½	.06½
3.00	3.00	3.00	3.00	Soln 50%, tanks wks...100 lb.	.....	3.00	3.00	3.00
.41	.40	.40	.40	Cyanide, 100 lb drums.....lb.	.40	.41	.41	.40
				Dithiofuroate, 100 lb dr....lb.	.....	1.00	1.00	1.00
.09	.09	.09	.09	Dust, 500 lb bbls c-1 wks...lb.	.08½	08½	.08½	.08½
6.40	6.07½	7.35	6.40	Metal, high grade slabs c-1 NY.....100 lb.	.....	6.45	6.45	6.45
.07½	.07½	.07½	.07½	Oxide, American bags wks..lb.	.07½	.07½	.07½	.07
.12½	.10½	.10½	.10½	French, 300 lb bbls wks...lb.	.09½	.11½	.11½	.09½
.....	.....	.....	.....	Perborate, 100 lb drs.....lb.	.....	1.25	1.25	1.25
.....	.....	.....	.....	Peroxide, 100 lb drs.....lb.	.....	1.25	1.25	1.25
.....	.....	.....	.....	Stearate, 50 lb bbls.....lb.	.25	.26	.26	.25
.03½	.03½	.03½	.03	Sulfate, 400 bbl wks.....lb.	.03½	.03½	.03½	.03½
.32	.30	.30	.30	Sulfide, 500 lb bbls.....lb.	.30	.32	.32	.30
.30	.29	.29	.29	Sulfocarbolate, 100 lb keg..lb.	.29	.30	.30	.29
.32	.32	.38	.32	Xylene, 10 deg tanks wks....lb.	.....	.33	.33	.33
.32	.30	.36	.30	Commercial, tanks wks....lb.	.30	.32	.32	.30
.38	.38	.35	.35	Xylidine, crude.....lb.	.....	.38	.38	.38
.03	.02½	.02½	.02½	Zirconium Oxide, Nat. kegs..lb.	.02½	.03	.03	.02½
.50	.45	.45	.45	Pure kegs.....lb.	.45	.50	.50	.45
.10	.08	.08½	.08	Semi-refined kegs.....lb.	.08	.10	.10	.08

Oils and Fats

.14½	.13	.14	.13	Castor, No. 1, 400 lb bbls.....lb.	.13	.13½	.13½	.13
.14	.12½	.14	.12½	No. 3, 400 lb bbls.....lb.	.12½	.13	.13	.12½
.17	.14	.18	.17	Blown, 400 lb bbls.....lb.	.14	.15	.15	.14
.17	.14½	.31	.13½	China Wood, bbls spot NY...lb.	.14½	.14½	.15½	.14½
.14½	.14½	.18	.12½	Tanks, spot NY.....lb.	....	Nom.	Nom.	.....
.14½	.12½	.....	.....	Coast tanks, Mar.....lb.	.12½	.12½	.14½	.12½
.11½	.10½	.12	.12	Cocoanut, edible, bbls NY...lb.	.....	.10½	.10½	.10½
.10	.09½	.09½	.09	Ceylon, 375 lb bbls NY....lb.	.09	.09½	.09½	.09
.09	.08½	.08½	.08	8000 gal tanks NY.....lb.	.08½	.08½	.08½	.08½
.10½	.09½	.10½	.09½	Cochin, 375 lb bbls NY....lb.	.....	.10	.10	.10
.09½	.08½	.10	.08½	Tanks NY.....lb.	.09½	.09½	.09½	.09½
.10	.08½	.09½	.08½	Manila, bbls NY.....lb.	.....	.09½	.09½	.09½
.08½	.08	.08½	.08½	Tanks NY.....lb.	.08½	.08½	.08½	.08½
.08½	.07½	.08½	.08	Tanks, Pacific Coast.....lb.	.07½	.08	.08	.07½



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Prices Current and Comment

Purchasing Power of the Dollar: 1926 Average--$1.00 - Jan. 1927 $1.042 - Jan. 1829 $1.047 - Feb. 1929 $1.025

853,194,207 pounds a year ago. Stocks on hand January 31 amounted to 141,595,247 pounds of crude oil and 511,161,742 pounds of refined oil.

Greases — Have declined ¼c lb. since last quoted. Production for quarter ended December 31 was as follows: white, 19,143,155 pounds; yellow, 19,531,709 pounds; brown 12,352,140 pounds. Stocks December 31 were: white, 9,236, 938 pounds; yellow, 8,219,978 pounds; brown, 5,850,219 pounds.

Lard Oil — All grades are ¼c lb. higher in price than when last quoted. Production during quarter ended December 31 amounted to 5,432,869 pounds, and stocks on December 31 to 3,509,226 pounds.

Linseed Oil — Is one point higher than when last quoted at 9.4c lb. on tanks; 10.2c lb. on barrels; and 10.6c lb. on five-barrel lots. For most of the past month sales were made at two points under those figures on firm bids, but towards the close of the month the market became firmer and only one point shaded on quantity business. The continued firm tone in the flaxseed market is due largely to the small production and low stocks in North America and a rapid disposal of the Argentine crop, with good demand from the United Kingdom. No official estimate of the Argentine crop has been issued for the present season. Estimate from trade sources place the production between 90,000,000 and 100,000,000 bushels, which is sufficient to balance the deficit in North America and place the world production above that of last year. Commercial stocks reported for the United States and Canada on February 2 were 2,515,000 bushels, compared with 6,374,000 bushels reported at the corresponding time in 1928 and 5,632,000 bushels in 1927. Exports are leaving Argentina and Canada in large quantities, while exports from India are small.

Red Oil — Has continued its uninterrupted march towards higher price levels and during the past month has reached the highest point for some years. Is quoted at 10¼c lb. in tanks and 11⅛c @ 11⅝c lb. in barrels. Production during quarter ended December 31, amounted to 17,711,677 pounds, and warehouse stocks on that date to 8,805,809 pounds.

Whale Oil — Production in the South Seas showed a large increase in December, according to the Department of Commerce. Up to January 1, Norwegian whalers had produced 650,000 barrels of oil, compared with 425,000 barrels last season. Reports at the end of November showed but a 15,000-barrel increase against the same period last year.

1928 High	1928 Low	1927 High	1927 Low		Current Market	1929 High	1929 Low
				Cod, Newfoundland, 50 gal bbls			
.69	.63	.66	.63	.....gal.	.63	.64	.63
.63	.60	.59	.59	Tanks NY.....lb.	.....	.60	.60	.60
				Cod Liver see Chemicals.....			
.06½	.05½	.06	.06	Copra, bags.....lb.	.....	.05½	.05½	.05½
.11	.10	.11	.07	Corn, crude, bbls NY.....lb.	.....	10¾	.10¾	.10¾
.10	.08⅜	.09½	.07	Tanks, mills.....lb.	.....	.09½	.09¼	.09
.12½	.11⅜	.14	.10½	Refined, 375 lb bbls NY....lb.	.....	.11¾	.11¾	.11½
.11½	.10⅜	.12	.11	Tanks.....lb.	.....	.11	.11	.10¾
.09¼	.07¾	.09½	.06½	Cottonseed, crude, mill.....lb.	.....	.09	.09	.09
10.65	.09¼	.11¼	.08 1/5	PSY 100 lb bbls spot.....lb.	.....	.1075	.1075	10.45
10.75	.09½	.....	.....	Apr.—June.....lb.	.....	.1080	.1080	10.60
				Degras, American, 50 gal bbls			
.05	.04½	.04½	.04½	NY.....lb.	.04½	.05	.05	.04½
.05⅜	.04½	.04⅜	do	English, brown, bbls NY....lb.	.....	.05⅜	.05⅜	.05⅜
.05¼	.05¼	.05¼	.05¼	Light, bbls NY.....lb.	.....	.05¼	.05¼	.05¼
				Greases			
.08½	.07	.07½	.06	Greases, Brown.....lb.	.....	.08½	.08½	.08½
.08½	.07	.08	.06½	Yellow.....lb.	.....	.08½	.08½	.08½
.11	.09½	.10⅜	.08¾	White, choice bbls NY.....lb.	.....	.11¼	.11¼	.11
.42½	.40	.....	.....	Herring, Coast, Tanks.....gal.	.....	Nom.		
Nom.	.09½	.09½	.09	Horse, bbls.....lb.	.09½	Nom.	Nom.	.....
.16½	.15½	.16⅜	.14⅞	Lard Oil, edible, prime.....lb.	.....	.15⅞	.15⅞	.15½
.13½	.12	.13⅜	.10⅜	Extra, bbls.....lb.	.....	.13½	.13½	.13¼
.13	.11	.12½	.10½	Extra No. 1, bbls.....lb.	.....	13¼	.13¼	.13
10.8	10.0	.11 4/5	.10 2/5	Linseed, Raw, five bbl lots...lb.	.....	.106	.106	1.05
10.4	9.6	.11 9/10	.09 6/10	Bbls c-l spot.....lb.	.....	.102	.102	1.01
9.6	8.8	.10½	.09	Tanks.....lb.	.....	.094	.094	.093
.09¾	.09¾	.09¾	.09¾	Lumbang, Coast.....lb.	.....	.09¾	.09¾	.09¾
.48	.40	.47½	.44	Menhaden Tanks, Baltimore.gal.	.....	.52	.52	.52
.09	.09	.90	.10	Blown, bbls NY.....lb.	.....	.09	.09	.09
.70	.67	.70	.67	Extra, bleached, bbls NY..gal.	.....	.70	.70	.70
.64	.63	.66	.63	Ligh, pressed, bbls NY....gal.	.63	.64	.64	.63
.67	.66	.66	.69	Yellow, pressed, bbls NY..gal.	.66	67	.67	.66
				Mineral Oil, white, 50 gal bbls				
.60	.40	.....	.....	.....gal.	.40	.60	.60	.40
1.00	.95	.....	.....	Russian, gal.....gal.	.95	1.00	1.00	.95
.19	.18½	.18¾	.14½	Neatsfoot, CT, 20° bbls NY..lb.	.....	.19	.19	.19
.13½	.12	.13½	.10½	Extra, bbls NY.....lb.	.....	.13½	.13½	.13¼
.16¼	.15½	.16¾	.12¼	Pure, bbls NY.....lb.	.....	.15¼	.15¼	.15¼
.17⅞	.11⅞	.18½	.10	Oleo, No. 1, bbls NY.....lb.	.....	.11½	.11¼	.11⅞
.15½	.11	.17	.08⅜	No. 2, bbls NY.....lb.	.....	.11	.11½	.11
.14	.10	.14	.08½	No. 3, bbls NY.....lb.	.....	.10½	.10½	.10¼
1.40	1.18	1.75	1.40	Olive, denatured, bbls NY...gal.	.....	1.30	1.30	1.28
2.00	1.75	2.00	2.45	Edible, bbls NY.....gal.	1.95	2.00	2.00	1.95
.11	.09⅝	.10½	.08⅝	Foots, bbls NY.....lb.	.10¾	.11	.11½	.10⅝
.09¼	.08¼	.09¼	.09	Palm, Kernel, Casks.....lb.	.08¾	.09	.09	.08¾
.09½	.07¾	.08¾	.07½	Lagos, 1500 lb casks.....lb.	.....	.09	.09	.09½
.08¾	.07	.08¼	.07¼	Niger, Casks.....lb.	.....	.08¾	.08¾	.08
.12½	.12	.14½	.12	Peanut, crude, bbls NY.....lb.	.....	Nom.	Nom.	.....
.17	.14½	.15½	.14½	Refined, bbls NY.....lb.	.14½	.15	.15	.14½
.21	.13	.16¾	.12½	Perilla, bbls NY.....lb.	.....	.20	.20	.20
.15½	.10½	.14½	.10	Tanks, Coast.....lb.	.....	.13½	.14½	.13½
1.75	1.70	1.70	1.70	Poppyseed, bbls NY.....gal.	1.70	1.75	1.75	1.70
1.06	1.01	1.05	1.00	Rapeseed, blown, bbls NY..gal.	..4..	1.04	1.04	1.04
.92	.83	.90	.82	English, drms. NY.....gal.	.85	.87	.87	.85
.90	.81	.85	.76	Japanese, drms. NY.....gal.	.84	.86	.86	.84
.10⅜	.09½	.10	.09	Red, Distilled, bbls.....lb.	.11½	.11⅜	.11⅜	.10½
.09½	.08	.09½	.08½	Tanks.....lb.	.....	.10½	.10½	.09½
.50	.42	.50	.50	Salmon, Coast, 8000 gal tks..gal.	.42	.44	.44	.42
.50	.41	.47	.43	Sardine, Pacific Coast tks...gal.	.....	.50	.51	.50
.13½	.12	.13	.11½	Sesame, edible, yellow, dos...lb.	.11½	.12	.12	.11⅞
.15	.12½	.14	.14	White, dos.....lb.	.12½	.12½	.12½	.12¼
.40	.40¼	.40	.40	Sod, bbls NY.....gal..	.....	.40	.40	.40
.....	.....	.09⅜	.09½	Soy Bean, crude.....				
.09¾	.09	.....	.....	Pacific Coast, tanks.....lb.	.....	.10	.10	.10
.12½	.12	.12½	.10⅜	Soy Bean, crude, bbls NY....lb.	.....	.12½	.12½	.12¼
.10⅜	.10½	.11	.10½	Tanks NY.....lb.	.....	.10⅜	.10½	.10¼
.13½	.13½	.13	.12	Refined, bbls NY.....lb.	.13¼	.13½	.13½	.13¼
				Sperm, 38° CT, bleached, bbls				
.85	.84	.85	.84	NY.....gal.	.84	.85	.85	.84
.80	.79	.82	.79	45° CT, bleached, bbls NY gal.	.79	.80	.80	.79
				Stearic Acid, double pressed dist				
.18½	.11	.13¼	.11¼	bags.....lb.	.18	.18½	.18½	.18
				Double pressed saponified bags				
.19	.11½	.14	.11½	.....lb.	.18½	.19	.19	.18½
.20½	.13½	.15½	.13½	Triple, pressed dist bags..lb	.20	.20½	20½	.20
.12½	.09½	.13	.08¾	Stearine, Oleo, bbls.....lb.	.11¼	.12	.12	.11¼
.09¾	.08½	.09	.07½	Tallow City, extra loose.....lb.	.09½	.09¾	.09¾	.09
.10¼	.09½	.11	.08½	Edible, tierces.....lb.	.10	.10½	.10½	.10
.12½	.11¼	.10⅜	.08½	Tallow Oil, Bbls, c-1 NY...lb.	.....	.12	.12	.12
.11¼	.10¼	.12¼	.10	Acidless, tanks NY.....lb.	.....	.11	.11	.11
Nom.	.08	.08⅜	.07¼	Vegetable, Coast mats.....lb.	.08	Nom.	Nom.	.08
.11	.....	.11	.11	Turkey Red, single bbls.....lb.	.11	.12	.12	.11
.16	.14	.14	.14	Double, bbls.....lb.	.14	.16	.16	.14
				Whale, bleached winter, bbls				
.80	.78	.78	.78	NY.....gal.	.78	.80	.80	.78
.82	.80	.80	.80	Extra, bleached, bbls NY..gal.	.80	.82	.82	.80
.78	.76	.76	.76	Nat. winter, bbls NY.....gal.	.76	.78	.78	.76

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LOS ANGELES

Acid acetic declines due to Pacific Coast manufacture. Acid oxalic firm, possibly high prices. Increased use of liquid caustic soda in the industries due to new plants built and being built to produce. Copper sulfate has advanced—both domestic and imported. Business quite active and collections fair.

BOSTON

While February's business has held up pretty well, it seems to be generally rumored that sales are not so good as they were the previous month. Prices in all commodities are holding generally firm, with some slight advances. Collections are very good.

DETROIT

Business conditions in this territory continue exceedingly good. The automobile plants are all working at capacity, in fact several are working night shifts, which naturally makes the chemical business very good. Collections are also very good.

KANSAS CITY

Business during February, was keeping up in a very good shape. However there are surface indications that seem to be keeping some uneasiness in the minds of some of the trade. Possible tariff revision is also disturbing. Severe weather has cleaned up all stocks of alcohol in this market. Blue vitriol is very firm and there are no real weaknesses as yet appearing in this market on any of the other items of any tonnage of consumption. We might further generalize that despite the optimism at the close of the year, there is now a feeling that with the dangerous condition of the stock market, business in 1929 may not continue to be as good as 1928 and conservatism is creeping into the picture.

ST. LOUIS

Altho business was rather slow during the early part of February, shortly after the middle of the month it showed a decided tendency to pick up. Most industries in the St. Louis territory report better business than they were enjoying a year ago. The paint and varnish industry has been rather inactive, reporting business slower than is generally the case at this time of the year. Naval stores are moving in relatively small volume, but in spite of this, the prices remain firm. The wholesale drug houses have not yet started to stock up for the spring demand. With the exception of nitrate of soda, which is selling for future shipment,

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agricultural chemicals have been rather inactive. Outstanding among the few price changes of the past month is the four cent per pound drop in the price of benzoate of soda, and a 2½c per pound drop in the price of liquid chlorine. Prices generally are stagnant, showing slight tendency to change. Collections are not good in spite of the fact that by this time 1928 accounts are pretty well liquidated.

NEWARK

The month of February has been one of fair volume in chemicals and kindred lines. Apparently, the volume of business is not quite as good as that of January. There seems to be keener competition for alkalies in carload lots. Conditions for March are encouraging and the general tone of business is still very good.

PHILADELPHIA

There seems to be an optimistic feeling in the chemical and oil trades in Philadelphia. While there are certain classes of textiles which are in a "lull" and heavy leather and woolen manufacturers are quiet, the balance of the outlook is favorable. Contract requirements are being called for in good shape and spot demands of most lines are many. Considerable interest is being displayed in Copper Sulfate, the season for which is fast approaching. The firm copper market portends a further rise in bluestone and buying is active. Naphthalene is another seasonal active item as well as Epsom Salts. Alkalis and bleach are in request by the soap and textile trades as well as bleaching chemicals for the latter. Since the last advance castor oil has been one of the most active items on the list and the outlook is favorable to higher prices on account of the firm castor seed market abroad. Collections are only fair. Spot stocks of Chemicals are light.

CLEVELAND

Business with the paint, varnish and lacquer manufacturers has been about the general average for this time of year, although the lacquer business has picked up materially since January. There has been very little linseed oil traded in of late and most of the buyers are waiting for a dip in the market before making commitments. Any lowering of prices would, undoubtedly, bring a fair volume of business on this product. The china wood oil market is also very quiet although there is some interest shown but buyers are looking for lower levels on wood oil. Steel and automobile accessory concerns are extremely busy.

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"WE"—Editorially Speaking

Book-taught Blinkins isn't a very popular authority and many a chemical executive regards with a more or less justified suspicion the "chart hound" and the "statistical expert" as a business forecaster. Despite this suspicion there is a sore need for any and every scrap of sound and practical prophecy that will help find the right answer six months hence to the perennial question, "How's business?" An economist who is a mathematician at Cornell University had done yeoman service to us all in balancing the strengths and the weaknesses of present day forecasting methods in his article, "How Long Will Property Last?"

A tip to wise readers—do not miss the article, "Industrial Reorganization." It is shrewd and canny—well worth a double reading.

In January we commented editorally on the new measure of plant efficiency expressed by the mystic symbol K-M-H, or Kilo-man-hours, an editorial that brought us a flock of letters and the article we publish in this issue from Joseph F. Hollywood. This new idea has evidently stirred this thoughtful dyestuff sales executive deeply. In these days of mergers what he says is in a strange key, a hopeful strain to the smaller manufacturer, a note of warning almost to the executive of the larger companies.

Criticism, when not constructive, does not attain to its highest and best function. Dr. Grosvenor's two articles revealing the patent situation will be followed by a third, in our May issue, in which he proposes, out of his considerable experience, to suggest a sane plan for restoring to the patent system that degree of safety and encouragement to the inventor, as well as to the public, which was the original intent of the patent laws.

Gas warfare definitely made a place for itself in military tactics in the Spring of 1915 when the German high command turned its effectiveness loose on the unsuspecting forces of the Allied Armies. At that time both opponents were deeply "dug in" and the long-drawn-out trench warfare had begun. Then suddenly came the horror of gas-filled trenches as the German forces brought this new weapon, product of a scientific age, into play. Unprotected and unprepared, the Allied forces were completely demoralized and but for the failure of the German high command to recognize the power of its new weapon, the Germans might have gained the decision in the Spring of 1915.

But the imagination to grasp the effectiveness of gas warfare was lacking, tactical application was faulty, the Allies had time to recover, and science went to work on the other side to protect itself and forge new tools to combat this development.

A decade has passed since the war and the military forces of the world have bent all their efforts to perfecting the technique of gas warfare. Something of what the Chemical Warfare Service has accomplished in this country during that period is told by Major General Fries in this issue.

It is an almost axiomatic, although not quite so well advertised a fact, that science and research does more for "farm relief" than legislation, proposed or accomplished. As evidence of this fact, we submit the story on the new by-product sulfur, developed in the laboratories of the Koppers Company, which is said by Mr. Sauchelli, to be ideal for use as a fungicide.

NOW IT CAN BE TOLD

Dr. Jones' personal reminiscences of the early days of the Solvay Process Co. will be followed each month by a similar first-hand account of some dramatic bit of the chemical industry's history from the lips of a man who was an actor in the events.

COMING SOON

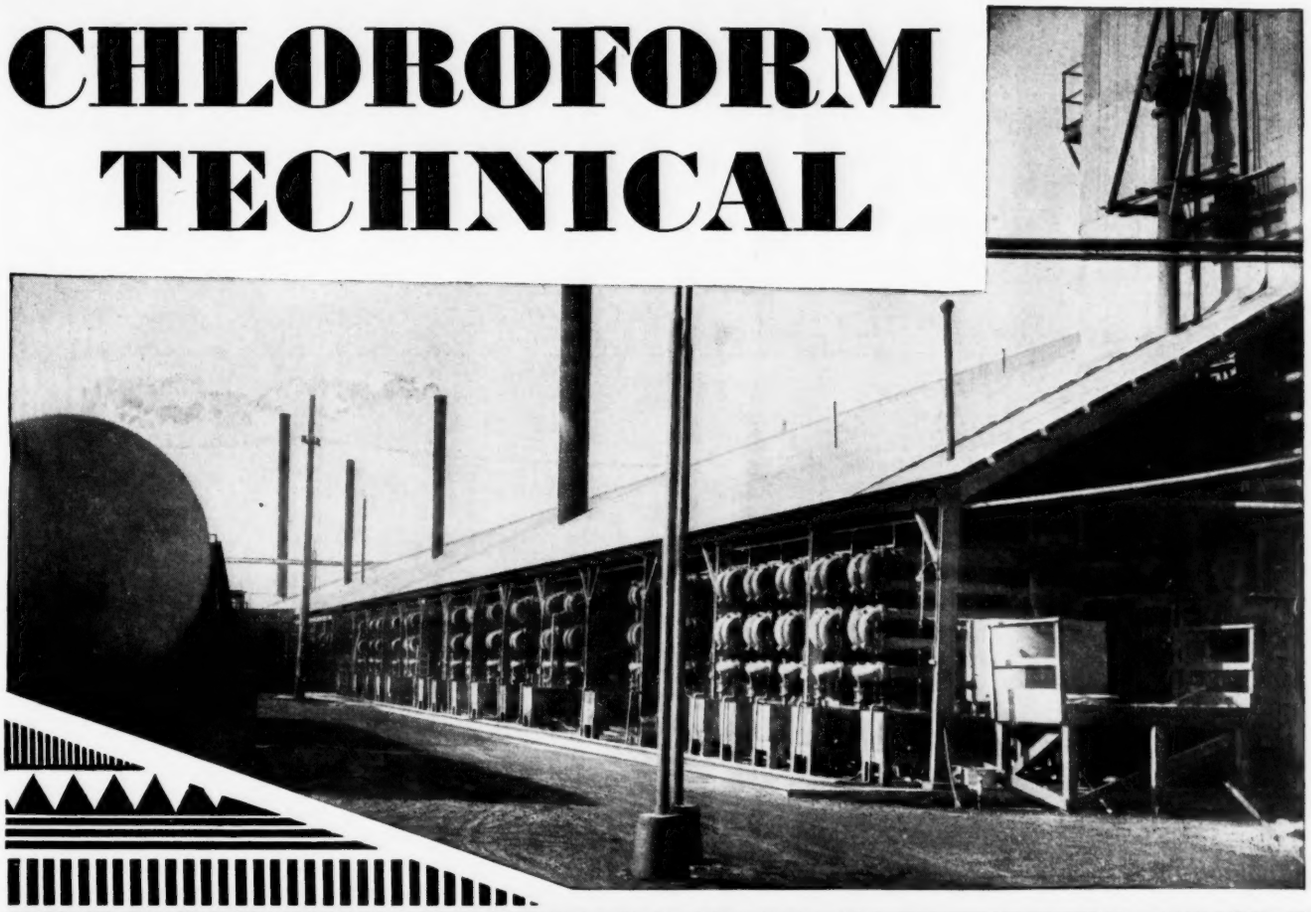
Dr. William H. Nichols on the formation of our first chemical consolidation, the General Chemical Co.

August Merz on the trials and tribulations of the American dyemakers in the "good old" (?) pre-war days.

H. Gordon MacKelcan, as assistant to C. C. Speiden, had an unequalled chance to know the inside of the wild-cat, war-time chemical speculation—a livid story, picturesquely told.

Dr. William A. Beckers will relate the stirring circumstances amid which a resourceful and courageous group of men laid the foundations of the American dye industry during the war.

CHLOROFORM TECHNICAL



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